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(PUBLISHED FOR THE BENEFIT OF THE LITHOTRIPTIC SOCIETY.)

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1837.

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BIBLIOTHECA BODLEIANA

TO THE MEDICAL READER.

To remove all appearance of ambiguity, we consider it necessary to explain the twofold character of this volume. The publisher having altered the title, the author has thought it necessary to justify the change by additional matter, consisting of a general recapitulation of the subject, and a bird's eye view of the whole domain of Lithotripsy.

The few first introductory pages are adapted for the general reader, and for those medical men who are not yet conversant with an invention which is (precociously) mature, but judging only by the years of existence that it numbers, is still in its infancy. The chronicle, and account of the benefits of Lithotripsy, with its graphic accompaniments—as also the statistical tables—are designed for both the technical and ordinary readers. The remainder of the volume concerns medical men alone;—it is more rigorously practical and technical.

As, generally, to distinguish which of two paths is the most compatible with duty, you must single out the most laborious, so commonly the best moral criterion of a man's labour and object, is the presence or absence of interested motives. So far we have in our conscience satisfied ourselves; but even when the feelings that actuate a writer have stood this most trying of all tests, in yielding to their impulse he may do what is injudicious, or violate that tacit compact, which exists betwixt all the members of the same profession, not to desecrate the sanctuary of its study by throwing open its penetralia to the gaze of every wayfarer. Supposing this volume were merely popular, popular essays have been written of late years by men holding the highest offices in the highest sphere of the medical profession. But we reject the authority of example *alone*, as its sanction might be found for the worst proceedings. The propriety of adopting a popular form of writing must be determined by considering the nature of the subject, and whether by tricking out a serious topic to attract the eye of the public, the author has not endeavoured to attract applause by sacrificing its scientific merits—and at the expense of brethren who bear themselves with more reserve and dignity. To prove that such an error has not been committed here, we prefix a few preliminary observations.

The reasons for publishing this little volume are the following; first that there exists no comprehensive English *compendium* on our subject for medical men; that Lithotripsy, as a work of ingenuity, setting aside its humane object, cannot fail to gratify the curiosity of all educated persons; and that in reading this account of it they may be induced to contribute to a highly interesting eleemosynary institution.

In all countries where a high degree of civilization exists and the medical art is duly cultivated, this new invention has produced intense interest. In the heat of the contest about its merits, indiscreet advocates both of Lithotomy and of Lithotripsy have carried forth the subject out of its appropriate seat of discussion — the halls of surgery where it ought to have remained. It is now placed partially before the public, particularly that portion of it, interested in it through their own sufferings, or those of their relatives or friends: each individual being violently prejudiced according to the party with which he has come in contact. *We* uphold that both Lithotomy and Lithotripsy are highly beneficial to mankind; that they are glorious achievements of the art of surgery, and that the happiest effects would result from their harmonious co-existence; because each possessing the virtues of which the other is deficient, the greatest possible perfection would be found within the circle of their resources. Such being the state of things, we need scarcely add that we deem it far from a derogatory office to endeavour to dispel the clouds with which prejudice has encompassed our subject.

There is a further cogent reason, we have not as yet stated, for doing so. Whilst those arguers who rejoice in the syllabic denomination of (Litho-) tomists are hurling anathemas against those who glory in that of (Litho-) triptists, and vice versâ—one faith shutting the gates of salvation against the followers of the other, with as fierce a bigotry as if they were two rival sects of Mahomedanism—during this fulmination of opinion, we say, the number of nervous patients who despair of both creeds daily increases. They either approach these beneficial processes after a long struggle, with increase of their disease and of their inauspicious terror—or carry with them their malady to an early grave. We shall mention elsewhere how many, and what eminent persons have thus fallen a sacrifice to unfounded terror.

We will not assert that Lithotripsy is perfect, and may not extend further its triumphs in mechanism; but we aver that it has far surpassed all reasonable expectation. Can we say less, when, for example, at the moment we are writing, we have but just left a case (not under our own care) where an old gentleman, a martyr to the stone and its fruitless treatment for thirty years, has been restored to health by Lithotripsy when on the brink of the grave.

As to the professional opponents of the discovery to which this work is dedicated, their arguments can only be resolved into this; that they seek absolute perfection: and until it is attained they will not allow of the enjoyment of the greatest comparative benefits. They expected this super-human perfection at the very birth of the invention!—need we add that they demand it now: they! whose very avocations prove that the mechanism of the Divine Artificer himself (by his doom) is imperfect, and that, even in the moral man, perfection is only to be sought after in the hope of becoming less faulty.

17, George-street, Hanover-square.
November, 1836.

INTRODUCTION.

CHAPTER I.

We would wish a reader, doubtful how far our subject would interest him, to cast a glance on the varied and delicate forms of the instruments figured in this work and then tell him—that they are destined to crush at a distance, with little pain, hard bodies—*placed out of sight*—in the bladder, an organ always of exquisite feeling, and at the time excessively, because morbidly sensitive;—that frequently, as soon as the instrument reached its destination, the size and form of the stone were ascertained, its circumference embraced, its substance comminuted and at once partly or wholly brought away. Thus informed, I think he would scarcely refrain from perusing this brief essay on a discovery, fraught with such evident ingenuity. But to this, if it be added that the disease for whose relief this consolatory discovery is intended, has long been characterized " as the most excruciating torment with which Divine Providence has decreed that the life of man should be mingled,"* its history acquires at once in the eyes of the rational being, who may perhaps some day be himself a prey to its dire effects, a heart-stirring, and vital interest: a feeling which must be followed, in all good minds, with the desire to extend this blessing to their suffering fellow-creatures. Hence has the duty of promoting such discoveries long been felt, and attracted even the attention of the members of the legislature in parliament assembled. Few persons conversant with parliamentary lore, can be ignorant of the singular history of Mrs. Stephens, to whom was awarded £5000 in 1739 for a *stone solvent*.† That deceitful *mirage* which so often blinds the public, and under whose false light the Animal Magnetism, the Homœopathism, and other quackeries of our days hold their golden triumphs, deceived the legislature; but no sensible man can doubt, that had the discovery been real, the discoveress had well merited her guerdon and the Commons only fulfilled their most imperative, their paternal duty to the people.

The discoverers of *our real remedy* have had honorary rewards, of Kings, of learned bodies, and the blessings of the many showered on them. We trust that more substantial benefits will be conceded to them as their just recompense.

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* Wollaston on Cystic oxide Calculus, Edinburgh Review, February 1810.

† We refer the reader to some interesting extracts, in the Appendix No. I. taken from the House of Commons and other contemporary records.

The reader will feel still greater sympathy in the object of this little essay when he has inquired what has been heretofore the only resource of the unfortunate sufferers from calculous disease. Suffice it for the present to answer, that rather than submit to the operation for the stone, which the imagination of the public has invested with magnified terror: many persons have dropped into a premature grave, although after lingering a few years in unutterable torture;—a circumstance which on reflection cannot create surprise, since depression of mind is the inseparable symptom of the disease of several organs of the human body in exquisite relation of sympathy with the sensorium. Thus it happens that it is as natural to find want of courage in a person suffering from stone in the bladder, as want of appetite in the stomach of one afflicted with a present corroding sorrow. Hence do we not find instances of such pusillanimity (if it can be named such) amongst obscure members of the community. One of the greatest philosophers of France, and certainly the greatest philosopher and statesman, without compare, of America, afford us melancholy examples.

Happy the man, who amongst his friends cannot mention a death that has thus deplorably occurred; happier still should we esteem ourselves, could we not instance such a case in one, the most gifted, of our nearest connexions.

We have then a more than ordinary motive to take interest in this beneficial discovery ;—and perhaps we may be allowed to pause a moment to show more clearly our " *animus* " in writing this essay, and to establish how far our testimony is of any value—is true and sincere. The latter may prove worth inquiry to the extra professional reader, who has not had the capability as yet (we trust he will possess it in some degree before we have done) of judging of the intrinsic merits of the subject in hand.

In a few words, we may then venture to state that we have no personal interest in the subject, although we have performed the operation of Lithrotripsy successfully, so far back as ten years ago, and have reverted to it occasionally: our time has been since absorbed by our official service, and by the less brilliant duties of family practice.

Our agreeable office this day, is to commend the discoveries and talents of others, particularly of such as have devoted *exclusively* to this subject remarkable mechanical genius, enlightened by a surgical education of the highest order and an experience on lithotripsy they alone probably at present possess in England.

As to our familiarity with what has been done in Lithotripsy, we were the first in England, we believe, ten years since, to recommend this discovery to public patronage; although we can but smile, now, that many years have passed over our heads at the crudeness of the little work, we then published, which partook, both of our own juvenility and of that of the new discovery.

On this account, the arrow we then aimed did not hit the quarry, and our first effort proved fruitless; but we are not discouraged in the pursuit of so fair a purpose and have drawn once more our bow to the cheek, remembering Bassano's Apologue:

> "In my school days when I had lost a shaft
> I shot his fellow of the self-same flight
> The self-same way with more advised watch
> To find the other forth; and by adventuring both,
> I oft found both."

And we were urged, by the charitable friends of the Science, to continue the work—amongst whom were not wanting more than one distinguished in this new branch of art—to say:

> "If you please
> To shoot another arrow that self-same way
> Which you did shoot the first, I do not doubt,
> As I will watch the aim, or to find both
> Or bring your latter hazard back again."

In writing what follows, which can only pretend at best to give an easily intelligible and correct description, as far as our limits will allow, we need scarcely say that we have found gradually to be accomplished what in our first enthusiasm we ventured to predicate. We have since followed with the greatest interest its progress, its trials, its improvements and its successes. We have thought that to the many persons in the land who remain secluded from Society through a cruel disease—spending their lives betwixt the desire of saving their life with its enjoyments, and the predominating fear of a supposed ruthless remedy;—that to these should be made known the real nature of the blessing in store;—at the same time that we furnish our medical brethren with a demonstration of what has been done in this new art.

We have felt no less convinced that the time was come, when *popular support* should be claimed in the last struggle against Lithotripsy of interested views, ignorance or prejudice*. And the more so, as one of those charitable institutions which are continually welling forth from British benevolence, as providentially as the healing waters from a mineral spring, is on the point of being finally established. This charity has for its object, the extension to the people at large of the benefits of

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* Far be it from us to allow it to be believed that Lithotripsy has been resisted by the medical professsion in England. We could record the conduct of many of its distinguished members who have most liberally supported or adopted Lithotripsy even at a time when it militated against their interests. We may mention, amongst others, a surgeon of European fame, Sir Astley Cooper; Mr. Green who has been successful in so many cases of Lithotomy and more especially, the great surgeon of the day Sir Benjamin Brodie into whose hands we believe we put some twelve years ago the first lithotrite brought to England, and to whose en-

lightened and powerful patronage the new art has been greatly the debtor. Sir Richard Dobson, the distinguished surgeon of the Royal Hospital at Greenwich, who gave the first opportunity, there, of operating by Lithotripsy in public, and who has continued since his valuable support to the new art in the charitable and active character of a member of the committee of the Lithotriptic Institution. And last, though not least, we must dwell upon the name of Mr. White lately President of the Royal College of Surgeons, who has taken up and furthered Lithotripsy from its very first introduction into England with that discriminating knowledge, that disinterested and generous zeal which have ever distinguished him. Many other members of the faculty are as remarkable for their liberal conduct in this respect, as for their high scientific position, but whose names unfortunately escape us on the spur of the moment. Even among the dissidents there are many persons who have been actuated by a natural prejudice against novelty—a wholesome feeling when not carried too far, which has saved English medicine from many of those revolutions of fashion in an Art where fashion should never intrude its withering influence. Others have been, and are still stimulated to opposition by passions which actuate men even when they do not suspect, but which reveal themselves in their rancorous expression, and by "killing with faint praise," as we have witnessed but too often lately as regards our subject. Some more candid enemies there are, whose dexterous hands have been so long wedded to the knife, that they deem every other weapon inferior or derogatory.

Lithotripsy hitherto reserved only for the most affluent of the community.*

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* This operation has hitherto been erroneously deemed exceedingly expensive, but it has always been proportioned by its professors to the means of every class and circumstance of society when there have been just grounds for doing so. The Lithotriptic Institution now places it gratuitously within the means of those who could not otherwise compass its benefits. We have heard but lately of two cases for which noblemen on the Continent have voluntarily given upwards of £1000 to a well known operator—this "largess" is generally adopted on the Continent: the reason for this is, that at the present stage of the Lithotriptic art, it is necessary that a surgeon should give to the subject his exclusive attention; his time is therefore given to the chance of cases, that are to ordinary cases but as one to a thousand. Hitherto, by constantly devising, studying, constructing and modifying, according to the nature of each case, instruments of the most costly fabric, the Lithotriptist could alone hope to maintain his usefulness and his reputation! Such is the degree of perfection already attained that the application of Lithotripsy, or even the removal entire of a small stone in a person whose bladder its presence has not yet diseased, is easily affected; such cases are managed with success by men, who however splendidly gifted, are totally inadequate from want of special experience and of a variety of resources, to the management of an intricate case, and the comminution of a large calculus. But such persons will sometimes (we hope thoughtlessly) turn round and say—" we have done this in a minute for a trifle, see what an exorbitant sum such and such a person exacts for an operation."—We know that too often our most " Righteous judge" the Public, will consider exorbitant a reward demanded by one whose discovery relieves and prolongs human life when this reward is but a tithe of that given for a few bravuras of an Opera Singer, or pirouettes of a Dancer; but Medical men who are

To this charitable institution which has already registered many cures, is to be added a school for Lithotripsy, under the most gifted of its discoverers—from which school the knowledge of the art may be extended to society at large. Here Lithotripsy may acquire all that perfection and certainty of which human invention can be susceptible. All those who have come forward to establish this institution are not only guided by the same benevolent views but many have studied, in all its details, the character and bearing of Lithotripsy. And not a few are they who have offered their gifts as a worthy thanksgiving to heaven—a votive offering to the institution for recovery of themselves and their friends from so dire a disease.

This institution is rising therefore on the best and securest foundations—the charity and reason of its founders, enlightened by the conviction of positive knowledge, and by experience mostly personal. Still are the workmen, and the as yet fragile edifice, exposed to warring elements from without, and before the superstructure can be roofed in from their invasion, much kindly and neighbourly assistance will be required: by which alone it can obtain an imposing form, general usefulness and durability. The new means of

taught from the first steps of their career, to cherish above all, human life, should not bow to such wayward opinions—much less give them currency.

relieving suffering humanity, to which this charity is dedicated, has experienced many obstacles, and the opposition to it in these latter times, has in some few quarters acquired a degree of intensity and virulence, proportioned to its success. A matter of no astonishment, *new* discoveries like new men never experiencing at any epoch of their career so great a resistance, as when ascending the last step to that predominance from which they can never again be dethroned; and indeed the day is just at hand when its opposers will be as submissive to its empire, as they have been factious in its rise. Fortunately there is in the first resistance to any new discovery, a wholesome influence, which whilst trying, increases its power, and tends to its perfection. In this Lithotripsy has been greatly benefited.

All we ask for it now, is to draw its vague, its hidden, as well as its more generous adversaries into a fair field of contest—persuaded that the perfection and magnitude of its powers, will then be revealed as well as those few imperfections which can be remedied. That Lithotripsy should ever recede in public favor is impossible. We have living witnesses who have undergone the process in every rank and profession, nay several of the medical profession itself, men of thews and sinews who are stubbornly walking the streets, although doomed for their contumacy, by certain prophets who would have them supposed cold shadows in Elysian retirement, or rather in the

> "Lugentes campi: sic illos nomine dicunt
> Hicquos......crudeli tabe peredit
> Secreti celant calles........
> ......Curæ non ipsa in morte relinquunt."

We will now proceed to give a short account of the history of Lithotripsy and a description within a certain range, of the instruments employed in this singular process. In this attempt we will only state what is essential for the full comprehension of the subject, by the uninitiated reader; to embody all, or to do justice to all that has been discovered, or attempted in every part of the globe, would fatigue the reader and defeat our purpose.

Those who are desirous to know further, may refer to the many works enumerated in the index of Mr. Cross's recent Essay on the Stone. Those means that have stood the test of trial are few: we have recorded the essential.

But before we proceed, we must protest against the opinion of any intention on our part of writing this essay to minister to the interest of any party.

Such is *not our* object, such is not certainly that of the public spirited and distinguished persons, who have formed the institution we wish to serve, as being our principal duty. They and we are desirous to concentrate for a time around the persons most gifted in this branch of knowledge—the best furnished with experience, surgical and mechanical resources—the means of perfecting the "materiel" of Lithotripsy and of conveying to the profession and to the world at large its singular benefits. A fairer compact to all parties could not be made: it neither deprives other inventors of their rights, or the medical profession of the use of this new "armamentarium chirurgicum."

CHAPTER II.

RELATION WHICH LITHOTRIPTIC INSTRUMENTS MUST BEAR TO THE FORMATION AND PHYSICAL PROPERTIES OF CALCULI.

To give an account of the formation and properties of stone in the human body, however interesting to Pathologists, however curious aud singular a process to men of the world who have some tincture of philosophy, does not come within the compass of our limits. Besides, who can handle such a subject, or attempt to add to its elucidation after the labours of Dr. Prout, whose compendious work every one must read. But there are a few points to which we must refer, important as regards the drift of our present work.

The zealous study and encouragement of Lithotripsy in this country must depend on the degree of frequency of the disease it is intended to combat. We will throw a passing glance at this point, although the least important, since stone is universally acknowledged to be a disease meriting the deepest attention. In this view, then, we find in the circumstances of this land, abundant reason for investigating everything that appertains to the cure of calculus. Stone, comparitively rare in tropical, and still more so in very cold regions—stone predominant in humid countries, where atmospheric vicissitudes are constantly disturbing the balance between perspiration and urinary secretion—has its natural seat in such a climate as that of England. But in addition to this, one should expect every day to see its frequency increase from augmentation of Dyspepsia—another powerful and prevailing cause of calculous disease. Indigestion being increased from changes in the quality of food, which is adulterated by being artificially reared and forced—and from the many habits of town life, by which we deviate from nature—indigestion, we repeat, is powerfully seconded in producing that dreadful disease, stone, by gout and still more so, through that course of dissipation, by which the secreting organ, the receptacle and the excretory channel of urinary fluid are so constantly affected.

But once more, the above is the least important consideration, and we should not have mentioned the peculiar formation of calculi, did not their qualities influence the character and value of instruments intended to pulverise them. The different qualities of hardness, softness &c., are ever to be borne in mind, when devising or using lithotriptic instruments, or judging of their *practical* merit. It is by forgetting that these were to be applied in the living being—to a stone formed in the human body, that mere instrument makers have committed such egregious blunders, and done so much mischief with tools *per se* of the greatest ingenuity. Let us, therefore, who will have to pass in review so many different instruments with pretensions to healing and to fame, cast a passing glance on the theory of the formation of stone.

Under the influence of disease, either the ingredients of the urine are changed, or such as are of the ordinary or of a totally new character, are secreted in excess. There is a point at which every solvent liquid will cease to take up any further quantity of any given salt—more being added, a deposit takes place. When the salts of the urine become over abundant, or some new principle is secreted, capable of forming, with the alkaline or earthy bases of the urine—soluble or insoluble combinations—crystalline or amorphous sediments are precipitated. Again, if an enlarged prostate, a strictured urethna, impede its requisite and timely egress, the urine becomes decomposed, and those deposits take place in the bladder, which are seen so abundantly in all the common receptacles of this secretion. After this has taken place, if obstacles still present themselves to the discharge of the lateritious particles, they may become gradually agglomerated through the medium of the mucus of the bladder. The individual in whom this has once taken place, or in whose bladder any other foreign body accidentally arrives, has the nucleus increased daily by fresh depositions of stone. Having read this description, and looking only at the surface of a vesical stone, the student will have but a very imperfect idea of what it is. He may compare this stone, so formed, to, and think it in every respect resembles (barring its origin) the stony formations in natural petrifying springs, such as that of Matlock. It is true that the channels of these waters, are lined with calcareous depositions—it is true that any article thrown into the water will become, every day, more and more encrusted, as a pin, a nucleus from the kidney, or agglomerated sand, will in the human bladder. But there is one important discrepancy in the comparison as regards our subject: in the petrifying waters, the formation of stone is continuous—that in the human bladder generally not so.* To-day there is in the urine, a great surplus of the lapidifying ingredients, and much stone is deposited round the nucleus,—to-morrow (from the state of digestion or some other cause) this chemical state of the urine ceases for a time; the stone already formed rolls about in the bladder, whose parietes throw out mucus for their protection;—the next day the former chemical qualities of the urine are again in the ascendant, and fresh calculous matter once more encircles the nucleus. Still, although under these circumstances, it does not coalesce, or rather amalgamate with the previous calculous formation, covered as this is with a varnish of unctuous mucus, or albumen.* The result is that calculi are generally *laminated.* This is a highly important circumstance as regards the instruments to prefer in Lithotripsy. Just as in cutting hard crystalline bodies, you must attend to the form of the crystals to effect the *cleavage,*

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* Singular mistakes are constantly occurring from changes in the nature of the chemical ingredients of the urine. Patients suffering from stone are, for example, given an alkali to relieve them, in the idea that the stone is of an opposite nature, because the urine is acid; but when the stone is removed from the bladder its chemical character may be found to be altogether opposite and not affected by that which the urine has presented latterly. The irri-

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tation of catheters and other instruments introduced for various purposes into the bladder, may alone influence for a time the character of the stone deposited; such irritation, not only from instruments, but probably, likewise, from any sharp angle or spicula of stone, may interrupt the previous secretion and command one of another kind by setting up an inflammatory action.

[*] It is this albuminous varnish upon the surface of the stone which appears to prevent its being acted upon by the ambient fluid. The power of urine, water, and chemical solutions under favorable circumstances to act upon calculus in the bladder, there seems no reason to deny. We will refer to this again in connexion with another part of our subject.

so must you in Lithotripsy apply the sort of power most likely to act upon a structure of *concentric layers*. It is on account of this circumstance that the application of *percussion* is so effectual, by its abrupt, sharp, transient blows, shaking off the adhesion of one lamina of stone to the other.

We say that the laminated structure of most calculi renders the application of percussion more effective. But where any other species of stone is to be contended with, what other power can be so well employed? Would we not smile were we to see a paviour trying to break by the pressure of a screw, a piece of granite which would bear the incumbent weight of a house? The routine of experience has taught him that stones, made by nature to support weight or pressure, give way to the comparatively slight blows of a hammer. We, who know the absolute laws of crystallization which superintend the formation of stone, must be aware that it will break easily in certain directions, following the particular geometrical form of its crystals. We, therefore, can explain the efficacy of the hammer, whose succussion leaves the stone, if we may so express ourselves, the choice of breaking in its natural lines of frangibility, when once the requisite momentum is given.

We might enter into other qualities of stone, did we not think we had said enough to recommend the subject to the study of those whom it behoves. We might, for example, show how percussion is, again, preferable and important in denoting the degree of hardness characteristic of the different sorts of stone : by this is indicated what sort and degree of force is to be applied to its disintegration—the hammer revealing what body the operator has to contend with, just as, to use a homely simile, it tells the carpenter who wants to hang up a picture, where there is hard wood, brick, or doughy mortar in the wall. Thus is obtained information, the pressure of a screw-instrument can never give ;—thus also is prevented as far as possible, the occurrence of accidents which might be of the most serious consequence.

Such, then, is the relation which the formation of calculus bears to inventions in Lithotripsy. But little evil would comparatively occur from the disease, and rapidly indeed would lithotriptic instruments relieve the sufferers, if the formation of stone were known at an early period. Unfortunately, it is more frequently at an advanced stage that patients apply for relief, and not unusually when the organs are deeply disorganized. If any individual suffers from disease of the eye or ear, he finds it out at once by obscurity of vision or of sound, and goes immediately to the oculist or aurist. The premonitory symptoms of stone are passed over unnoticed, or attributed to any other cause but mechanical irritation from the presence of a foreign body. As regards this disease, no greater service can be rendered humanity than to spread the knowledge of the principal symptoms of stone.

A sensation of burning and pinching at the extremity of the glans—sometimes extending the whole length of the urethra, is a circumstance of very great suspicion, and which becomes almost a certainty when combined with a sudden and frequent stoppage in the current of urine. These are followed later, when the stone is increased in volume, by pain in the abdomen, or over the region of the bladder—at the bottom of the scrotum—frequent efforts to pass water; pain and difficulty in so doing—the appearance of mucus or pus in the urine; and occasionally of blood, especially after any active exercise—a sense of weight and bearing down in the rectum, etc.

Spreading the knowledge of the symptoms of calculous formations in the kidney would be equally serviceable to humanity. It is certainly no less extraordinary and inexplicable that so many renal calculi should be allowed to descend unnoticed into the bladder, requiring sooner or later an operation more or less severe. When a patient, particularly if he is of a gouty habit, after complaining a long time of nephretic pains, is suddenly seized with some of these symptoms:—fever, retching or vomiting, numbness in the upper part of the thigh, as also a darting pain in the course of the cutaneous nerve of the hip; this accompanied with retraction of the testicles, and spasm and pain in the direction of the urethra— under these circumstances the patient must go at once to his surgeon.

We have unwittingly trespassed beyond the assigned boundaries of our domains—the temptation which allured and detained us being the extent and deep interest of the view from our roadside. Proceeding to consider the instruments which repair the evils arising from the formation of stone, we beg the reader to bear in mind, at the proper time of discussion, the relation which this subject has to the value of these instruments.

CHAPTER III.

CHRONICLE OF LITHOTRIPSY, AND DESCRIPTION OF THE INSTRUMENTS OF ITS EARLIER ERA.

THE operation for extracting the stone from the bladder by incision, has so absorbed the public mind on account of its magnitude and its serious consequences, that the notion of withdrawing calculi through the natural channels has been deemed a recent suggestion. This gentle method, however, which in its turn engrosses the attention of the whole medical world, and of those persons in society who suffer from stone or fear it, and whom the cheering news of its invention has reached ;—this method, we repeat, was the first mode of relief attempted by the professors of the healing art—a circumstance not in any wise astonishing: it is the process that suggests itself by such cures, as Nature herself sometimes effects. Besides, it could only be after despairing of every other means, and having gained a considerable knowledge of anatomy, that so formidable an operation could be resorted to with some chance of success, on the part of the ancient chirurgeons, and with hope and consent on that of the patients. In ascending the stream of history to olden times, we find that the Egyptians were the first to seek and devise means of expelling through the natural channels the calculous bodies formed in the bladder. For this purpose they endeavoured to dilate the urethra by distending it with air, and when the stone had once dropped into its posterior entrance, they guided it by dexterous pressure to its external orifice.

Prosper Alpini, a distinguished professor of botany at Bologna in the beginning of the seventeenth century, relates a mode which the Arabs successfully employed, he says, to extirpate the stone. This consisted in the introduction of a tube into the urethra, by means of which they distended with air from the mouth, both the bladder and its outward channel of communication, so as to allow of the passage of a calculus—the air was then suddenly allowed to rush out, and with it the calculus. The calculus was then lodged in the urethra, from which it was withdrawn by suction, by pressure, or by the use of appropriate instruments. Alpini says he saw three individuals cured by these means. This report has been corroborated since by Mr. Roveretti.

Of course such a process could only succeed in cases of gravel or of very small stones. If these were not discovered at their very first formation, or did any delay occur, all hope of success by this simple remedy vanished. Besides, were these stones in the least degree voluminous or rough on their surface, the patient would have consented to any more violent means, rather than endure the sufferings their pressure in the passage occasioned.

It was then that Lithotomy was invented, which consists in cutting a way into the bladder through the thickness of the intervening parts, after having well secured the patient, hand and foot, and passed into the organ through the urethra the grooved sound which is to guide the cutting instruments. The bladder laid open, an instrument is introduced, the stone grasped and brought away, and measures taken to prevent the serious results that might occur from the operation.

Lithotomy is performed at the neck of the bladder, anteriorly above, and posteriorly. These three modes and the different instruments with which they are performed, have each had their partizans.

Such is a slight summary of Lithotomy, over which we are desirous to throw a veil, which it were useless for the public to penetrate. We are desirous to do this, for even when not formidable, the idea of an operation has produced in the minds of patients the most baneful fear. Lithotomy will be more rarely adopted every day, and no conscientious surgeon, in a few years hence, will practise it, but in those cases for which it must still, and for ever, remain the only resource. In a few seconds it is performed by the great hospital surgeons of the day: the duration of pain at the moment is the least objection to it. We have even had an instance not many years back, of a surgeon performing the operation on himself: a knife and a mirror were his whole apparatus.

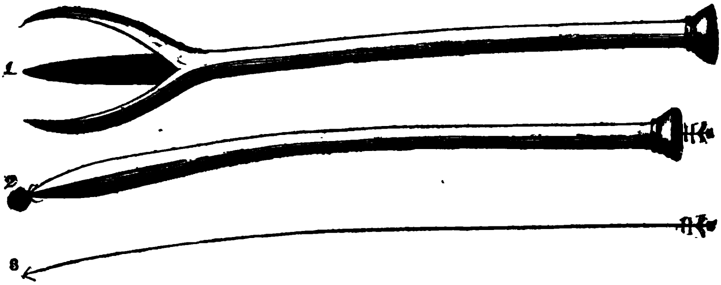
To follow the chronology of our narrative—at the time we referred to, Lithotomy was, therefore, generally adopted, the other means being found ineffectual, and this one more speedy and more brilliant in its execution. There always remained, however, some ingenious men amongst the surgeons of old, stimulated to exertion by the wish to save humanity from sufferings and dangers. They recurred to the first idea of withdrawing the stone through the natural passages, and thought of rendering this more effective by employing mechanical means.

In 1519, Alsaharavius speaks of breaking down friable stones in the bladder, by means of an instrument of which he has not left a description.

In 1626, Sanctorius gives us a sketch of another instrument. It consisted of a tube, of which one of the extremities was divided into three flexible branches. These were to dilate when introduced into the bladder, and be brought in contact with its parietes, and the stone carried by the fluid within the branches, was to be withdrawn at the same time as the instrument.

No. 1.

Instrument of Sanctorius open—the same instrument closed, and the stilet for the purpose of closing it.



The form and mode of using this instrument proves that it was made of some soft substance.

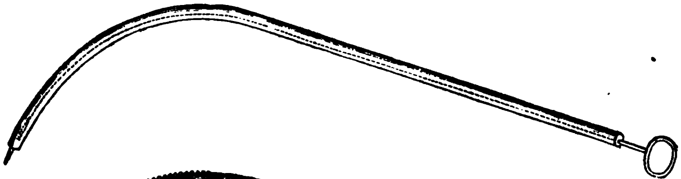
A little later Severinus states, that Joannes Germanus proposed to him to lay hold of the stone in the bladder, by means of an instrument having three denticulated branches; but he conveys but an imperfect idea of this instrument, of which he does not publish any design.

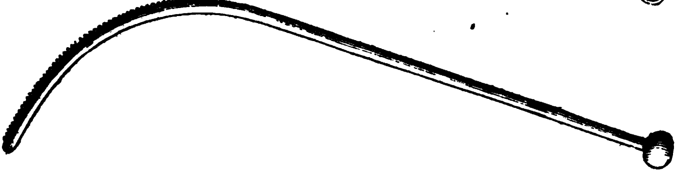
If we except some fugitive notions found in authors, this is a summary of all that had been thought of and performed by the older surgeons to avoid the extraction of the stone by means of incisions. The only transient light that breaks through the silence and obscurity attending the subject for many ages, arises from ingenuity due to personal suffering.

A monk of the order of Citeaux, stimulated by the pain a stone lodged in his bladder occasioned, contrived a mode of acting upon it by percussion, through the medium of a sort of small chisel. Having introduced the stilet into his bladder, through a canula of soft substance, he used to give the calculus sudden, though slight blows, with a little hammer applied to the outward end of the stem of the instrument. He exhibited as a curiosity a little box full of particles of stone thus brought away.

No. 2.

Instrument employed by the monk of Citeaux.





No. 3—*Instrument used by Colonel Martin.*

Dr. Darwin mentions this subject in his Zoonomia, and proposes an instrument for destroying the stone in the bladder without incision. The great obstacle to this being effected, appeared at the time, the necessity of the instrument used being straight, whilst ordinary instruments introduced into the urethra are curved.*

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* Albucasis, who lived in the eleventh century, had in his possession straight instruments to crush and extract calculi lodged *in the urethra;* but these, from their clumsy construction, must have been unfit for use. Five hundred years afterwards, Ambroise Paré also had straight instruments to pulverise calculi, but these he only intended to use *in the urethra.* About the same time, Fabricius Hildanus, and Sanctorius, proposed instruments to act in the bladder itself; but these were curved. It is only during the last century, that we find evident traces of the straight sound being intended for the bladder: it is mentioned by Rameau, in 1729; by Lieutand, in 1776: by Santerelli, in 1795; by Lassus in his lectures to his pupils; and by Mr. Montagu in 1810. But we must add, that all the above-named practitioners allude to the subject more as a possibility than as an habitual thing; and that probably straight instruments were not used in practice. Lieutand says, and it will prove how far the fact was considered possible: "that he knows of no one circumstance, either in a healthy or a diseased condition of the parts, which will prevent a straight instrument being introduced into the bladder—unless it be a calculus stopped in the passage." Later, Messrs. Larrey and Ribes, amongst others assert having for upwards of twenty-six years used straight sounds. We may, therefore, say that although instruments of this shape were well-known, and even applied before the employment of Lithotripsy, no beneficial results accrued from this fact; since, from the age of Celsus, (who flourished under the reigns of Augustus, Tiberius, and Caligula,) up to the present time, calculi

Not only are straight instruments of very large calibre introduced now with ease into the bladder, but amidst the ruins of Herculaneum and Pompeii, in the officina of the surgeons, are said to have been found straight sounds that appear to have been habitually used.

Before the ingenious Darwin published the work referred to above, a singular incident occurred. A French officer of high rank in the service of one of the native princes of India, had found means of destroying a stone with which he was troubled, by introducing into the bladder a curved sound, of which the convex side of the extremity was made rough like a file. The stone, by its gravity, fell in contact with the instrument, which was worked by the patient backward and forward until he effected the reduction of the calculus. Dr. Darwin thus relates the fact, and the idea it suggested to him. The reader may refer to plate 3.

" A curious account is given in a letter to Sir John Sinclair from Colonel Martin, who asserts, that after using bougies and injections into the bladder, the passage of the urethra became less sensible to pain, and he was enabled to introduce small files—I suppose with their backs smooth—

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were only removed by incision, or when in the urethra, by Hunter's forceps, modified afterwards by various persons.—(Vide on this subject, M. Tanchou's Work.)

that by these he gradually filed away the stone as it lay in the neck of the bladder. When the stone did not properly present itself, he introduced warm water, by injection, into the bladder, and thus, by again endeavouring to discharge it, brought forward the stone to the neck of it. He used the file three times in 24 hours, from April to October. (Medical Journal, No. XI, p. 121.) If this process should be again attempted, the file might be introduced through a flexible canula with a metallic hood at the internal end of the canula to cover the back of the file, so as to prevent the friction of it against the urethra or neck of the bladder. If the urethra should become so insensible as to admit easily the frequent introduction of a metallic canula, might not two fine steel wires, properly tempered, be joined at one end by a hinge, and be thus introduced through the canula into the bladder, and when protruded beyond the extremity of the canula they might open, by their elasticity, so as to receive the stone, and confine it against the end of the canula, by extracting them? The proper direction of the wire springs, so as to open when pushed through the canula, must be previously given them. If this could be managed, a small file or borer might, at the same time, be introduced through the canula, the handles of which might consist of joints to permit them to bind in all directions, and thus the stone might be broken to pieces by a few trials ; or, if it was a soft or fragile stone, the retraction of the wire bow might divide it at every trial. A little mechanical ingenuity might be necessary in the construction and use of this machinery, but I believe it not to be impracticable, since I read the above account of Colonel Martin, though I had often before thought with despair of its successful application."—*Dr. Darwin's Zoonomia on the Laws of Organic Life. Third Edition,* 1801. Vol. III, p. 66.

But the search after this discovery, so valuable to humanity, had been nearly abandoned, when, Dr. Gruithuisen, a Bavarian physician, published in 1813, in the Medical Gazette of Salzburg, lucubrations altogether novel upon this subject.

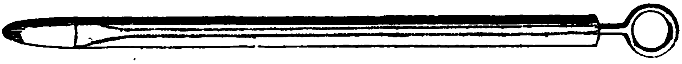
His first predominant idea referred to the dissolving of the stone, a subject which had occupied before many persons; amongst others, the great Wollaston.

But he suggests the injection into the bladder of a chemical solvent through an entirely straight tube which, as we have said, had not hitherto been used ; or at least, only by chance—and without deriving from this circumstance the advantageous conclusion it suggests.

On the contrary, Dr. Gruithuisen, availing himself of its feasibility, says, that not only the straightness of the tube would allow of directing the stream of the solvent immediately on the stone, but would also enable the operator to act mechanically upon it.

No. 4.

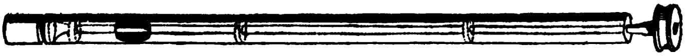
Gruithuisen's straight sound, with the little cap at the extremity allowing of its introduction.



Considering also that the calculus would be more quickly dissolved, in proportion as it presented more surfaces for the liquid to act upon, he proposes to perforate the stone by means of a trepan introduced through the tube.

No. 5.

Gruithuisen's instrument with the trepan.

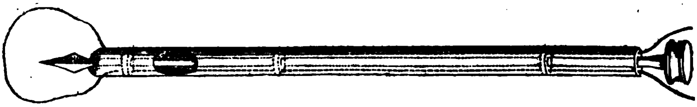


The trepan so introduced, had fixed to its extremity a pulley, allowing of its being made to work on the surface of the stone by means of a drill-bow.

He suggests the use of another trepan in the shape of a lance—(also inclosed in a tube)—which he proposes to introduce into the main catheter. This lance is destined to perforate the stone, whilst it is held by a loop of wire also contained in the tube.

No. 6.

Gruithuisen's instrument with the lance.

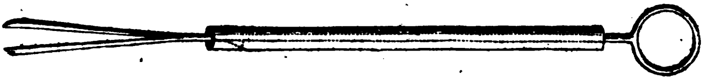


By the above drawing, it is seen that the loop which the wire forms can be drawn close upon the drill by means of the ends that protrude by the sides of the pulley.

Finally, to complete the apparatus he devised for destroying the stone in the human bladder, he proposes an instrument which he calls a *stone cutter*, consisting of two blades enclosed in a tube. The layers of stone seized by these two blades were to be cut asunder, by withdrawing them within the tube..

No. 7.

Gruithuisen's stone-cutter.



Such were the ideas given to the medical world, by Dr. Gruithuisen, in 1813; a few years after which, Mr. Elderton, an Englishman proposed an instrument for breaking down the stone in the bladder.

In 1819, we repeat, at a time when nothing had yet been published in France, Elderton, in England, proposed instruments to seize and comminute calculi in the bladder; but these were curved and were not considered applicable, we believe, from the notion then entertained that straight instruments alone would admit of the full development of all the mechanical powers necessary to the performance of Lithotripsy.

But we have shown before, the impossibility of recording here every plan proposed or even all those that have been tried. Otherwise, we should have to pay our homage successively to an interminable number of persons who have either shed light, or (like ourselves) ink on this subject—such as Messrs. Costello, King, Ferguson, L'Estrange, Lukin, and many other meritorious gentlemen to whose labours we beg to refer. Some of their instruments have stood, to a certain degree, the test of trial;—most have failed to maintain themselves in public estimation.

We cannot, however, pass over the ingenious instrument maker, Mr. Weiss. The difficult office of his vocation is to embody, as it were, the thoughts of his surgical patrons, and no person has succeeded so well.

We will pass over in silence the very useful instrument, for extracting small stones entire, which he made for Sir Astley Cooper, because it is so well known and is not a lithotriptic instrument; otherwise we could not omit describing the admirable contrivance of this distinguished surgeon. As to another important instrument which we shall have to describe in its turn, at least in a certain modified form, we shrink from giving an opinion on the contention it has given rise to betwixt Mr. Weiss and three or four other persons, and must refer to the former and the other gentlemen's published testimonials on the subject: "adhuc sub judice lis est." All we may venture to say is, that Mr. Weiss is capable of devising any instrument of which a competent anatomist can explain the purpose, qualities, and dimensions.

But one observation we must impress upon the reader, and he will be convinced of its justness, before we cast off the last leaf of this little sketch :—

Lithotripsy is not now, nor ever will be, we are sure, a process consisting of, or depending upon the use of one instrument or one apparatus: otherwise its resources would be scanty indeed. Its proper performance depends on the possession of several instruments and apparatuses combining together for the desired result, varied and modified, at the moment, according to the emergency of the case. The lithotriptic apparatus must have a quadruple object in view: to avoid giving pain—to ascertain the size and form of the bladder and stone—to grasp and reduce the latter to atoms—and to combine with the very act of comminution, the faculty of safely and rapidly bringing away the calculus. Nor is it less important to place the patient in a convenient position to the operator and himself, during the application of the remedy. This is found very simple, easy, and rapid by a competent person; but, as we have said before, it is a study that in its present state requires a nearly exclusive attention; and to perfect it, persons particularly gifted with mechanical genius, manual dexterity and tact, as well as anatomical and surgical knowledge.

The following observations are so judicious and true, and withal so instructive, that we cannot resist reproducing them here from the work of M. Tanchou on Lithotripsy, published 1830.

" From the descriptions given of the process of Lithotripsy it appears so simple and easy that there is no patient who does not feel inclined to be operated upon, nor a medical man who does not think himself capable of performing the operation. Hence the number of instruments which have been sent, some into the provinces, some abroad; thence also the numerous attempts which have been made; the numerous errors which have been committed—even by surgeons, and men of great merit: for it deserves remark, that almost all the chief surgeons of the Parisian hospitals have tried Lithotripsy and that all have failed; which proves that this operation is not so easy as one imagines. Since three years above all, more than six thousand apparatuses of Lithotripsy have been sent from Paris, as much to the provinces, as to foreign countries, and, however, a few instances of certain success only are known. To perform this operation, besides cleverness and address, a great deal of practice is required, which is obtained only with time, and by handling unceasingly the instruments which are intended for it. The working of these is so difficult, although apparently very simple, that one ought almost to have made them oneself to know them well; or to identify oneself so much with them, that they may be said to guess your intentions; or that the fingers convey themselves unaided upon the point which it is necessary to set in motion during the operation."

So marvellous is the dexterity of some few persons who have devoted themselves exclusively to Lithotripsy, that we would of all things refrain from judging of the value of their apparatus by their own success. In their hands it would appear that every instrument would achieve a triumph;

and if, independent of the success of the inventor, we did not find that the instruments we shall laud at a future chapter of this work had not inherent qualities, we should not have praised them so fervently.

CHAPTER IV.

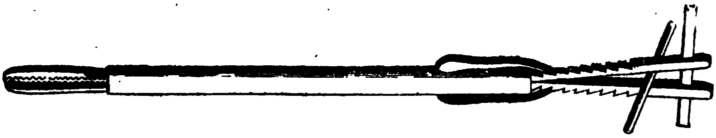
HISTORY OF LITHOTRIPTIC INSTRUMENTS OF A MORE ADVANCED ERA.

IN 1822, two French surgeons submitted the result of their Lithotriptic researches to the Academy of Medicine.

Dr. Amussat,* recurring to the notion of Gruithuisen of introducing into the bladder sounds absolutely straight, proposed an instrument which is to destroy the stone by pressure.

No. 8.

Dr. Amussat's Instrument.



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* To this able surgeon, M. Amussat, was due much of the first progress of Lithotripsy—were it only his popularizing and shewing how easy was the use of the straight sound. The first Lithotriptic instruments having assumed this form, and until its

It consists of two branches which are withdrawn into a tube through the means of a spring and clickwork—and thus crush the stone placed betwixt them.

This instrument is not adopted in practice, for the branches do not open sufficiently to seize calculi of any size.

Dr. Le Roy d'Etoilles* modifying and pushing

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adaptation, no progress having been made. In 1830, his apparatus consisted of:

1st. A forceps having three tenacula, similar to that of M. Civiale, and intended for the same purpose.

2nd. A perforator or drill without the enlarged head, made to revolve round and pierce the calculus by means of a drill-bow; the whole apparatus being fixed, during its action, in a sort of hand-vice held by an assistant.

3rd. A species of drill, having the power of developing itself so as to make a much larger hole in a calculus than with the common perforator.

4th. A different instrument, termed a stone breaker, adapted to seize and crush portions of calculus.—(See plate No. 8.)

His works are:

" Concrétions Urinaires de l'Espèce Humaine, classées dans le double rapport de leur volume et de leur forme."—*Paris.* 1832.

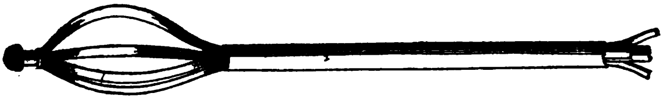
" Leçons sur la Lithotripsie, et la Lithotomie postéro-pubienne. *Paris.* 1834.

* M. Le Roy is one of the men who have most contributed to the first progress of Lithotripsy. To him is due the almost entire construction of the three-branched instrument (of which only a primordial idea existed before him,)—the drills and several other mechanical resources, other medical men have improved upon.

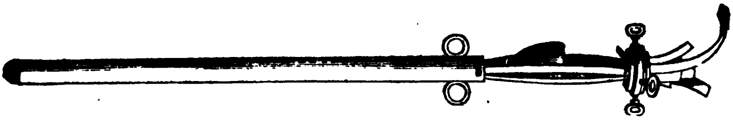
farther another proposition of Gruithuisen, contrived an instrument consisting of a tube, containing within it four watch springs, the ends of which are attached to a sort of stud forming two crossed loops betwixt which the stone is to be caught.

No. 9.

Dr. Le Roy's Instrument open.



The same Instrument closed, and showing its full length.



But although recent discoveries have rendered his inventions in a great degree obsolete, he must ever be remembered with due eulogium in the history of the new art. His apparatus consisted of

1st. A three-clawed forceps, elastic, and similar to that described in M. Civiale's apparatus.

2nd. A drill intended simply to perforate the calculus.

3rd. A drill that developed itself so as to excavate the stone as far as possible.

In short, various drills and excavators of different constructions, and more or less complicated.

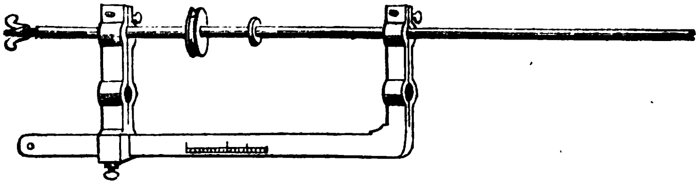
The name of M. Le Roy's interesting work is :

" Exposé des divers Procédés employés jusqu'à ce jour pour guérir de la Pierre, sans avoir recours à l'Opération de la Taille. 8vo. *Paris.* 1835.

Whilst incarcerated in this manner the stone was to be perforated by means of a metallic rod, introduced through the tube, and put in motion by means of a drill-bow, or of a winch—and to render the movements of this rod easier, it is to be mounted upon an apparatus like that used by watchmakers.

No. 10.

Dr. Le Roy's apparatus.

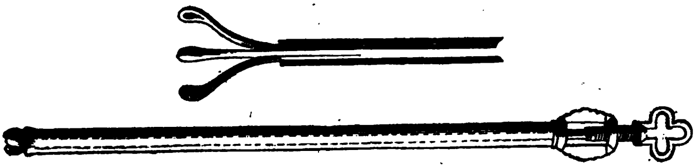


But this apparatus, which is an improvement on that of Gruithuisen, does not maintain itself in practice. The reason is, that the watch springs do not possess sufficient consistency to enable them to remain dilated in the bladder, and to take a firm hold of the calculus, and the drill has not sufficient breadth to make large holes in the stone, and destroy it rapidly.

Dr. Le Roy soon found in a bullet extractor, long ago invented by Alphonse Ferri, qualities entitling it to be adapted with advantage to the seizing of stones in the bladder.

No. 11.

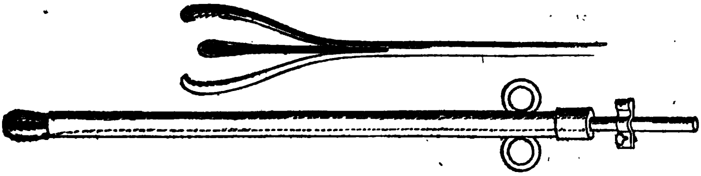
Bullet extractor of Alphonse Ferri, open and closed.



With this instrument the stone might be laid hold of by the three branches, and the drill of Mr. Le Roy applied to perforate it.

No. 12.

Dr. Le Roy's instrument open and closed.



Although this instrument might, indeed, be used in practice, it did not succeed. The simple rod, which it was proposed to introduce to perforate the stone, is too small to produce a large quantity of detritus, and consequently to comminute rapidly.

Now we must bring forward on our stage of observation M. Civiale.* The instruments he proposed previous to the period we are come to, we will not mention for the sake of brevity, since whatever their merit may have been, we do not think them superior to such as we have already mentioned, and which laid a foundation for those of his devising which we are going to describe.

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* The apparatus of M. Civiale consisted first of an internal tube, divided at its vesical extremity into three elastic branches

Our reference to them, though sufficient for our present purpose, will be laconic, we have done ample

or tenacula, and playing in an external tube. The end of each branch terminated in a sort of hook, and the internal surface of each tenaculum was roughened like a file—so as to retain a calculus firmly.

2rdly. It consisted also of a central stem or drill, the end of which was as large as could be contained between the branches, for the purpose of making in the calculus as large a hole as possible.

3rdly. Of a "chevalet" or hand-vice in which the instrument was placed in order that, during its action upon the stone, it might be steadied as far as could be accomplished by the hand of an assistant.

His works are:

Nouvelles Considérations sur la rétention d'urine, suivie d'un Traité sur les calculs urinaires, sur la manière d'en connaître la nature dans l'intérieur de la vessie, et la possibilité d'en opérer la destruction sans l'opération de la taille. 8vo. *Paris*, 1823.

—— De la Lithotritie, ou broiement de la pierre dans la vessie. 1826.

—— Lettres sur la Lithotritie, 8vo. 1re lettre, 1827. 2me lettre, *Paris*, 1828—3me lettre, sur la Lithotritie Uréthrale, suivie d'une Revue de l'état actuel de la Méthode Lithotritique. *Paris*, 1831.—4me Lettre sur la Lithotritie. *Paris*, 1833.

—— Remarques sur le Rapport de la dernière commission des prix Monthyon, en ce qui concerne la Lithotritie.

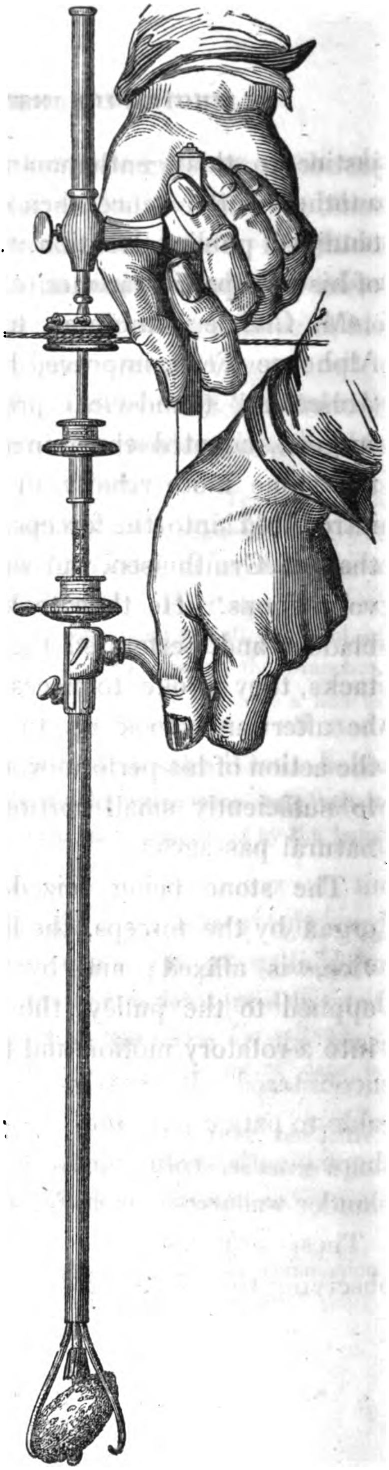
justice to this gentleman at a former period, in another work: since then other inventions have obtained public attention, without depriving him of his own particular merit.

M. Civiale combining together the forceps of Alphonse Ferri, improved by M. Le Roy, with the "chevalet" (hand-vice) proposed by the latter surgeon, adapted them ingeniously, so as to seize the stone more readily in the bladder. He next introduced into the forceps, a trepan analogous to that of Gruithuisen, but with a termination more voluminous. He thus took hold of stones in the bladder and perforated them till, by repeated attacks, they broke to pieces. Each of these pieces he afterwards took up, to submit them again to the action of his perforator, until they were reduced to sufficiently small portions to be voided by the natural passages.

The stone being seized in the cavity of the organ by the forceps, the little *chevalet*, or hand-vice, is affixed; and by means of a drill-bow applied to the pulley, the perforator is impelled into a rotatory motion and the stone is drilled.

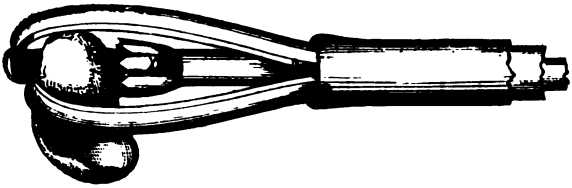
With this instrument (see Plate,) M. Civiale met with positive success in the treatment of patients, but further experience in practice taught that although these means were applicable in some cases, they were far from sufficiently responding to the object in view.

It was found that much labour and research were still required by science, before the art of curing calculus by mechanical means, and without incision, could be numbered amidst its most important discoveries. Some of the principal objections were: — that each time a hole was made in the stone with this instrument, it was necessary, in order to renew its action, to let it go and

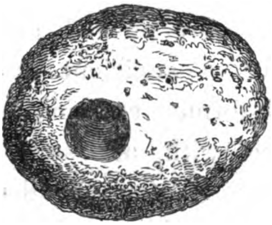


take it up again:—this was a source of suffering to the patient. In addition, the drill tended constantly, of course, to re-enter a hole previously made, and thus baffled the efforts to bring the perforater into action upon some unbroken surface of the stone. Besides this, the instrument was not calculated to take hold of flat calculi, and seized with difficulty those of an oval form;—irregular fragments were also very unfavorable to its action. When the branches were pushed out considerably, in order to have a sufficient degree of expansion, their hook-formed extremities were liable to come in contact with, and sometimes lay hold of, the coats of the bladder when its surface was uneven. To this might be added that the apparatus being held by an assistant whilst the operator plied the drill-bow, the instrument was necessarily shaken, and the patient put to great pain by the occasional jerks arising from the consequent absence of steadiness and immobility in the supporter. Hence it followed that, although this instrument was successful in cases where a small and round stone was to be encountered, it was not advantageously applicable to patients troubled with stones of a flattened shape—with voluminous calculi, or where the bladder was irregular in its shape.

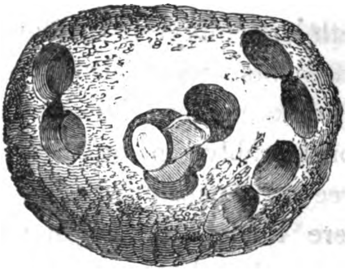
These imperfections will become evident by observing the following three wood cuts, Nos. 14, 15, and 16.

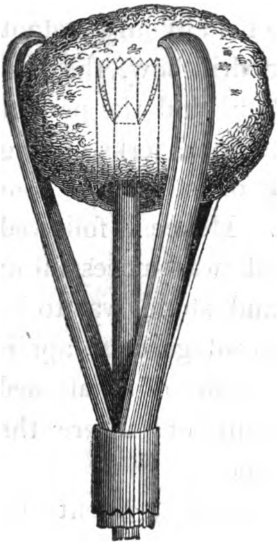


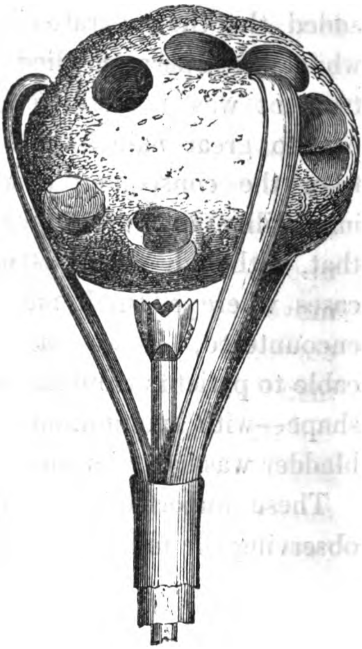
15.



16.



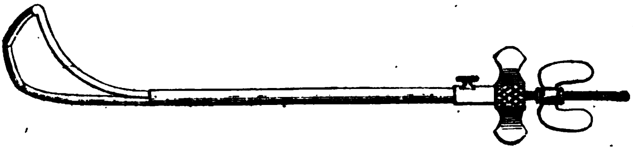




Not to break the concatenation of ideas which should attend the next series of instruments to be described, we will notice here an isolated instrument of singular ingenuity and simplicity. But it appeared long after the time at which we are arrived, in our chronicle of inventions. It was devised by Dr. Jacobson, a Danish physician, who presented it to the Academy of Sciences of Paris, and received as a reward the second prize Monthyon in 1832.

No. 17.

Dr. Jacobson's Instrument.



This instrument is seen to consist of a canula, within which are two stems of metal; when closed, it resembles a catheter. One of these stems (the upper one) is immoveably fixed; the lower one is moveable on the former, and has two joints at its curved extremity. Such being the form of the instrument, it will be readily understood that when the screw-like termination of the lower moveable stem is pushed forwards, its curved extremity moves out on its hinges and forms a loop. In this loop, Dr. Jacobson intended the stone to be caught and then crushed against the immoveable stem by means of the fly-nut, which, when turned from left to right, advances upon the screw extremity, and draws in the moveable stem, closing the loop formed by the articulated termination holding the stone.

We have not been able to find any record of cures effected through the medium of this clever instrument, and should think that calculi of any size would be with difficulty laid hold of, and that it would be still more difficult to accomplish the extraction of the last fragments. It has the great defect of becoming clogged up with detritus which adheres to it, and becomes harder in proportion as it is more violently compressed. Under such circumstances, which would prevent its being completely closed, it could only be withdrawn by stretching beyond prescribed limits, or even tearing the urethra. It is very fragile.

We have drawn attention to this instrument, in spite of these objections, because it forms part of our history; besides that, the great Institute of France bestowed upon its discoverer so distinguished a reward—with the same liberality it had bestowed on another foreigner, M. Gruithuisen, in 1827, the gold medal of encouragement, and two thousand francs for his invention in the same branch of art.

The inventor, Dr. Jacobson, had so much the more merit that he had never performed Lithotripsy;* he presented it to the Institute without supporting it by any examples of its healing powers. This affords a proof of the favour with which the discovery of a stranger to the land is received in France. May the example be followed in every country.

We must now pass over in silence the instruments, (most of them only modifications) of that distinguished physician, M. Recamier, those of Meirieu, Tanchou, Colombe, Fournier, Rigal, Bancal, Cazenave, Pamard, Pecchioli, Sir, Henry, &c. Students may learn much by referring to them: the motives of their discoveries and their controversies reveal the true character of Lithotripsy—but they have not met with sufficient success to demand a place in our compendium.

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* As a generic word intended to express the operation of *comminuting* calculi, without reference to the manner in which this is accomplished, we consider *lithotripsy* and not *lithotrity* the correct expression. The latter, *lithotrity*, signifies the mere act of *perforating* or *boring*, from its Greek derivation—λιθος *stone*, and τερέω or τετράω to *perforate*. *Lithotripsy*, on the other hand, implies in a general manner, the comminution or breaking of the stone, by whatever mechanical agent this is effected: its derivation is λιθος *stone*, and τριϐω to *pulverise* or *comminute*; τρίψις *pulverisation*.

CHAPTER IV.

BARON HEURTELOUP'S INSTRUMENTS.

In 1824, (the year in which the instrument with three branches was applied,) Baron Heurteloup* first pointed out the defects of the operation for stone without incision by the means then in vogue.

Proceeding analytically and bearing in mind that the first duty of the surgeon, who wishes to cure a person afflicted with stone, should be to make himself thoroughly acquainted in each case with the character of the substances to be destroyed, and with the organ in which he is to dis play the powers of the instruments, Baron Heurteloup began by devising an instrument to arrive at this knowledge.*

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* This gentleman, a Graduate of the Faculties of Medicine and Laws of Paris, is the worthy son of his distinguished father—first surgeon of the armies of Napoleon. Through his meritorious services, the latter became a favourite of the Emperor, who bestowed on him title and honours—and a historical fame, by devoting to his praise a portion of one of those laconic and pithy bulletins which made such noise in Europe. The medical officers of the army struck a medal to his honor, in which the words of the twenty-eighth bulletin of the "grande armée" are consigned. Never, perhaps, will such another opportunity of distinction for a Surgeon General occur—and most fortunate it is for humanity—since after the battles of Essling and Wagram, Baron Heurteloup had under his direction 32,000 wounded, principally by cannon!

He did not find, in the ordinary long curved sounds, by which the size and form of the stone and bladder are ascertained, sufficiently accurate means of *exploration.*

He therefore set about constructing an instrument which would enable him to reach a great degree of accuracy. Its construction, simple as it may appear, enables the lithotriptic surgeon who has sufficient tact and experience, to ascertain, with great nicety, an infinity of circumstances which it is indispensably necessary for him to be acquainted with, before he ventures upon operating.

Amongst many other such necessary details of information may be enumerated; first—acquaintance with the existence of a calculus—whether there is one or several—their form and position, whether moveable or not, their nature and volume—what are the diameters of the bladder—the quantity of water to be injected to give the viscus the extension the most favourable to the operation. Likewise must be known the form of the bladder, its regularity or unevenness—whether there does not exist in it pits where the stone may lodge—if contractions do not impart to it a form which may interfere with the play of the instruments—whether the urethra is large, equal in calibre, without stricture—if its incurvations can easily be drawn into a straight line, &c. In a word, he must acquire the knowledge of numerous circumstances which must influence, very considerably, the application of the delicate process of Lithotripsy. No surgeon, who possesses knowledge and a conscience, can approach an operation on a calculous patient, whether with or without the knife, without a determination to strain to the utmost his faculties, to meet with such study the gravity of the case.

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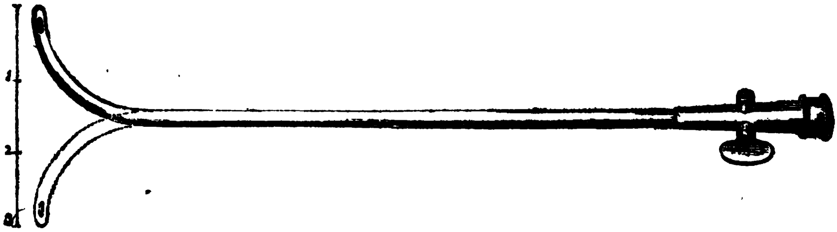
* Vide Lettre à l'Académie des Sciences. *Paris* 1827.—And Principles of Lithotrity. London, 1831.—By Baron Heurteloup.

To the surgeon the means of detecting all the above circumstances is therefore invaluable; but it concerns him, more particularly, when applying Lithotripsy. Unfortunately, in Lithotomy, you cannot, beforehand, ascertain the state of the parts in the channel through which you are to arrive at the stone, since the passage to the bladder is made artificially. It is one of the brightest features of Lithotripsy that it does not sever organs whose degree of morbid disorganization is unknown beforehand.

To reach the accomplishment of the important desiderata just mentioned, Baron Heurteloup constructed the "*sonde recto curviligne*" the recto-curvilinear sound.

No. 18.



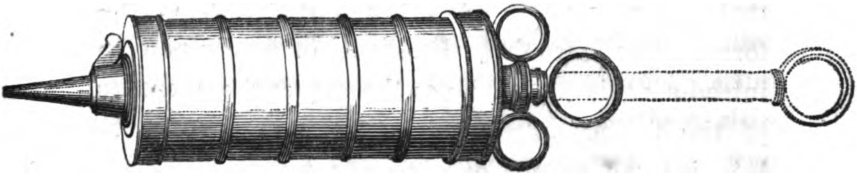
In the wood-cut, the reader will observe that this sound is straight from its handle to the beginning of its incurvation. When the curve is in the bladder, the straight portion is in the urethra, and makes this channel obey the impression of its form. The mere fact, therefore, of being able to introduce this sound, gives the surgeon a measure of the facility of the operation with respect to bringing the urethra to a straight line.

The incurvated portion is short and abrupt, and is equal to the quarter of a circle of three inches in diameter—so that the surgeon by inclining this curvature right and left, establishes whether the bladder of the patient possesses a lateral diameter of more or less than three inches—which is the desirable breadth.

Carrying the curvature downwards, the greater or less depth, and regularity of form of the part beneath the neck of the bladder is ascertained.

By drawing the instrument first towards himself, and then pushing it away from him as far as he can, the operator determines the antero-posterior diameter. At the handle of the sound there is a small stop-cock that may be opened or shut at will, and allows of the introduction of water, which may be permitted to flow off when it is desirable. The water is injected to impart to the bladder the degree of dilatation desiderated, and this is effected, by placing the sound in communication with a syringe to which its inventor has given the name of Surgical Syringe.

No. 19.



It has merited this distinction of name by the facility and delicacy with which it may be handled; having two rings affixed to its body, which allow of using it with *one hand*, whilst the other is engaged in supporting the instrument which conducts the fluid into the bladder. By means of the distension of the bladder in varied degrees are revealed many circumstances regarding its condition with respect to the operation.

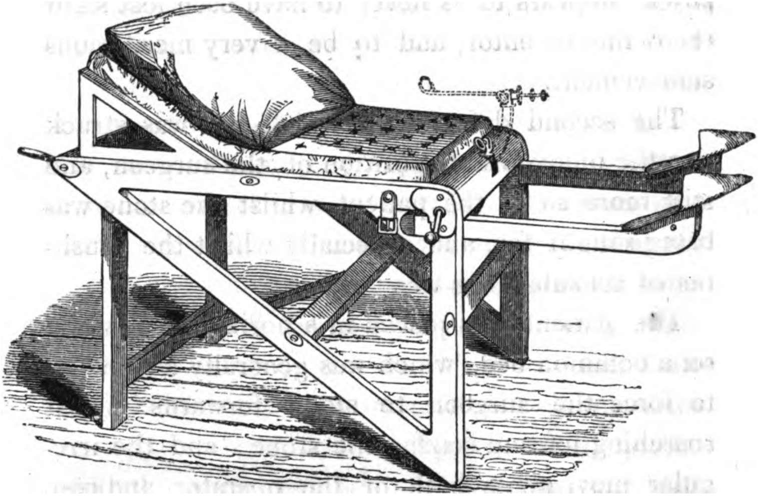
Here let us, in passing, observe, that to make his instruments so as to be used without assistance, and, by the *right* hand alone, (which is the seat of the greater delicacy of touch and of power) appears to us never to have been lost sight of by the inventor, and to be a very meritorious achievement.

The second defect with which he was struck was the unfavourable position of the surgeon, and still more so of the patient, whilst the stone was being sought for, and especially whilst the crushing of its substance was going on.

The patient was placed in a horizontal position on a common bed, which was generally so low as to force the surgeon to stoop forwards whilst searching for and seizing the stone; and the irregular movements both of the operator and operated, prevented that gentleness and delicacy with which the operation ought to be performed. Baron Heurteloup thought that if he could devise the means of placing the patient in an easy position so that all the muscles should be in a relaxed state; and the surgeon in a suitable posture to have the use of the whole delicacy of his touch, he would by these means, render the operation infinitely more easy, and avoid all the evil results that had arisen previously from the bad position of the patient and of the surgeon.

It was to arrive at this important result that the rectangular bed was invented, so called on account of its shape.

No. 20.



This bed is composed laterally of a frame work of wood representing a right-angle triangle; and on it is laid a small mattrass. Anteriorly there are two pieces of wood, having at their extremities two slippers for the patient's feet. These can be lengthened or shortened at pleasure, to suit the height of the patient. In front there is a cross piece of wood, very thick, uniting the two triangles together. In this is seen a mortice, for the small vice to play in, which holds the instrument during its action on the stone, and of which we shall speak immediately.

It is readily seen that the patient having his head upon the pillow, the pelvis upon the anterior extremity of the small mattrass, his feet in the slippers—is in an easy and convenient position for the operator to act; and every facility for the necessary evolutions is obtained.

But besides this favorable position, there was another object of the greatest importance in view in inventing the *rectangular bed.* It was remarked that in the horizontal position, the stone frequently rested below the neck of the bladder, and that in order to dislodge it (which was found previously sometimes impossible) it was necessary to make movements with the instruments extremely distressing to the patients, which rendered the operation not only painful, but dangerous. In order to obviate this serious inconvenience, the faculty of being changed, when needful, from the horizontal to an inclined position of 45°, or less, was given to the rectangular bed. So that when the patient was thus placed the neck of the bladder would be uppermost, which would impel the stone towards the posterior part where it would be easily seized* by the instrument, and without making movements, that not only inflict great pain, but might inflame the organ.

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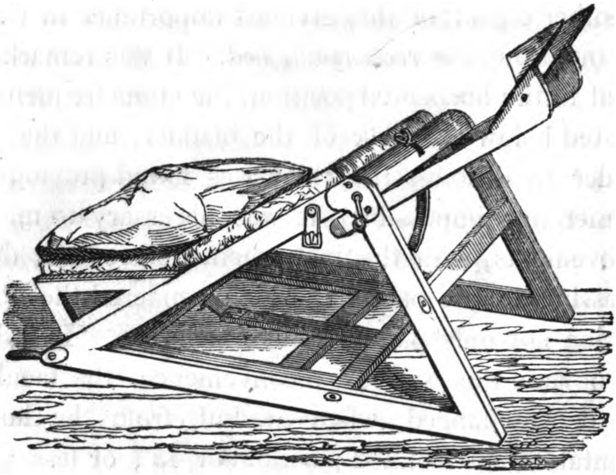
* A la faveur du renversement de la table sur laquelle j'étais placé, et qui me mit la tête en bas et les pieds en haut, mon noble ami put saisir le calcul que cette position avait porté vers le fond de la vessie. Ces mots : *je le tiens*, furent magiques. Le criminel qui se prépare à la mort ne ressent pas une plus grande joie

No. 21.

The rectangular bed inclined to an angle of 45 degrees.



When the patient is inclined as above described, it is evident that if no means be taken to prevent him from slipping backward, he will do so.

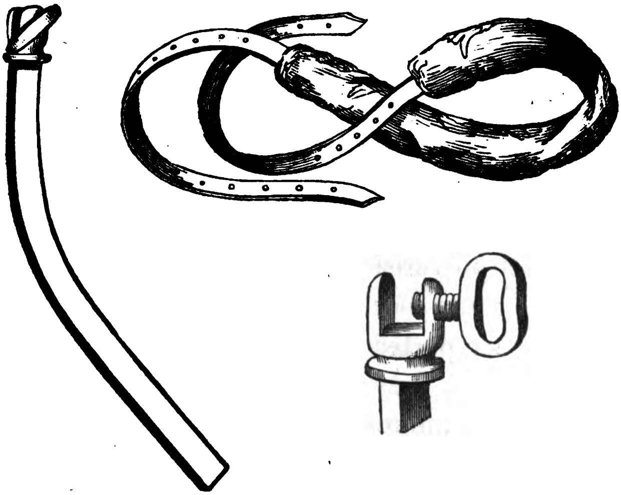
à la nouvelle de son absolution ; toute douleur disparut, il n'y eut de place au cœur que pour le sentiment de la délivrance.

La pierre saisie, dans un diamètre de 5 lignes, fut à l'instant brisée par cinq coups de marteau, qui rapprochant les branches de l'instrument, permirent sa retraite. C'est avec la même satisfaction que je ramassai les portions broyées renfermées dans ses branches. Ma joie était celle d'un combattant lorsqu'il voit terrassé l'ennemi qui menaçait ses jours.—*Letter of Dr. Bigel, describing the operation performed on him by Graef with Baron Heurteloup's instruments.*

It was to avoid this that a strap was used, which, passing behind the neck and before the shoulders, was fastened at both sides of the bed to the buckle, which is seen at its lateral and anterior part.

Nos. 22, 23, 24.

Strap for preventing the patient from slipping backwards.—On the left is a front view of the "fixed support" at full length; below is a side view of the same, shewing the mortice which receives the instrument, seen in dotted lines No. 20.



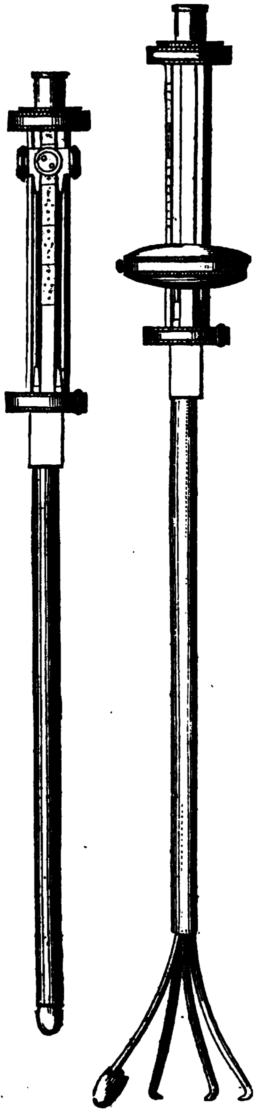
Baron Heurteloup having by means of the simple apparatus, we have just described, fulfilled the important object of placing favorably both the patient and the operator, (who now possessed ease in all his movements, since during the operation he could constantly be in nearly an upright position,) next directed his attention to a very important point, viz. that of devising means of fixing the instrument whilst acting upon the stone in the interior of the bladder. For it may easily be conceived that, when simply held by an assistant, it could not present sufficient solidity to prevent the patient feeling the shock caused by the vibrations during its action. Besides, however firmly the assistant held the instrument, he could not support it immoveably enough to prevent that, by an insensible movement, that part of it charged with the stone, should be directed against the posterior walls of the bladder, or retrograde into the neck—both circumstances equally to be avoided. And finally it is evident that an instrument which had to perform a mechanical action, like that of pulverising a stone, often of very great hardness, could not be brought fitly into action when only supported by the vacillating hand of an assistant.

Under the impression of these well grounded objections, Baron Heurteloup thought that, since the breaking of the stone took place in the water (previously injected in sufficient quantity to fill the bladder), the next object was to hold the part of the instrument grasping the stone in the *middle* of that fluid. He thought that if he could place at the anterior part of the rectangular bed, a piece of solid metal, which could adapt itself to the handle of the instrument when holding the stone, and fix it immoveably by a rapid and simple means, he should render the art of curing the stone by pulverization infinitely more susceptible of being executed with success. The instrument fixed as in a vice, would have a much more advantageous play upon the stone, and its action being directed solely against this foreign body, held in the middle of the liquid, could no longer injure the bladder. And thus the patient would experience no painful sensation during the pulverization of the stone—would therefore remain quiet and permit the surgeon to operate with facility and certainty. It is to attain this important result that the "fixed point," or "fixed support" was invented. (Plate, pp. 58 & 61.)

This is seen to be a strong bar of metal, constructed with the greatest simplicity. At its superior extremity there is a mortice, upon the sides of which there is a screw with a key handle to facilitate its being turned with the hand. It is easily understood that the instrument placed in this mortice or groove can be readily fixed. As to the manner in which this "fixed point" is rendered moveable or not at pleasure, reference must be made to the page which represents the bed. By means of the tourniquet which is found at the right side of the anterior piece of wood (and which forms the handle of a strong stem of iron sufficiently long to press upon the curved bar or "fixed point");

this "fixed point" can be made firm or moveable at pleasure. It is manifest, that this steel bar having the power of moving forwards and backwards, upwards and downwards, it can be made to seek the instrument in any direction according as the particular form of the organ of the patient makes it desirable. This bar likewise fixes the instrument firmly during its action on the stone.

Thus were fulfilled these important indications;—first, of placing the patient in a favourable position,—secondly, of placing also the operator conveniently, so that he might have the liberty and freedom of his movements,—thirdly, of allowing the position of the patient to be changed at pleasure, by raising the pelvis considerably, in order to make the stone fall to the bottom and posterior part of the bladder,—and lastly, fixing the instrument in a steady manner during its action upon the stone. After these objects were attained, Baron Heurteloup devoted his attention to devise the most advantageous means of pulverizing the stone. His first idea was to construct an instrument by means of which, when the stone was once caught, it could be excavated—and only leave in the bladder, after its action, the exterior surface of the calculus, in the form of a shell, and of course, the quantity of powder produced by the excavation.



No. 24.

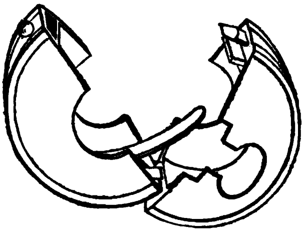
Baron Heurteloup's four-branched Instrument, closed and open.

To effect this he commenced by devising a peculiar instrument bearing four branches, susceptible of being moved separately or together, at pleasure. When once the stone was caught by the *simultaneous* action of the four branches, they could afterwards be moved *separately*, and so be applied firmly to the stone, whatever its irregularity might be, and offer it four points of support. We will now describe the manner in which this was effected.

The branches of this instrument were moved separately or together, according as the four buttons (corresponding, and fixed to the handle-end of these branches) were enclosed or not in the kind of box which we have here shewn open, and which is seen in its place upon the instrument, in the preceding figure.

No. 25.

Box by which the four branches are moved together.

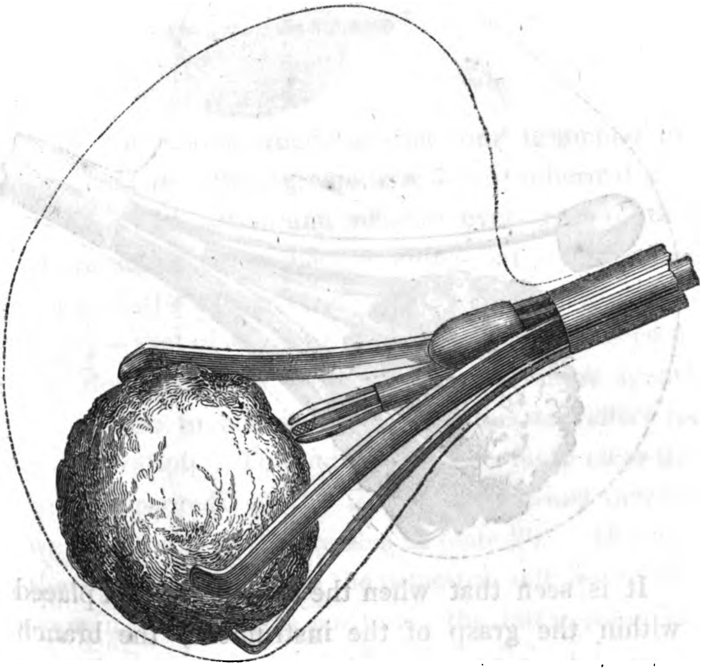


If this forceps be opened in the bladder in the manner represented, calculi of a spherical shape would have a tendency to come of themselves within its branches.

It will be seen that the little button-like end of the fourth branch, which forms the termination of the instrument when it is shut, is drawn back between the two lateral branches to separate and support them, and also to give the stone more facility of entering within their grasp. (Vide plate 26.)

In order to ascertain whether the calculus was sufficiently enveloped by the four branches to be well grasped, a small accessory forceps, called "pince servante," was introduced through the main forceps. The following figure represents the small forceps in the act of ascertaining the position of the calculus between the branches of the main forceps.

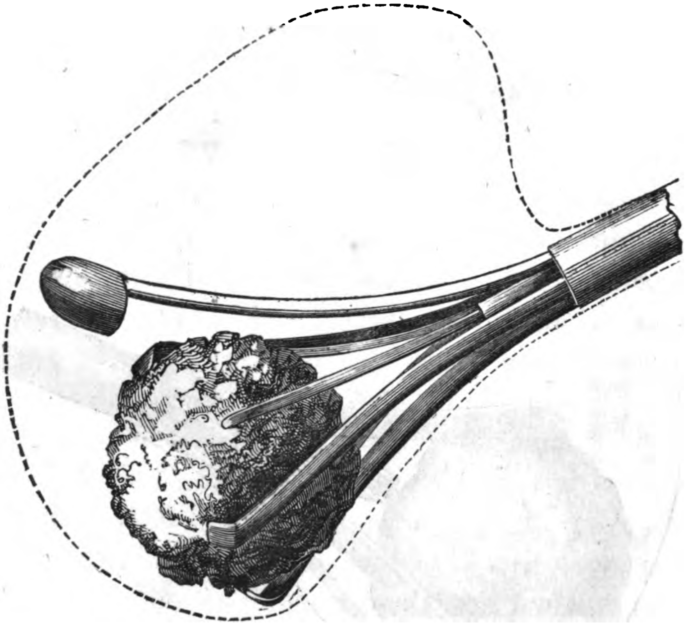
No. 26.



If the stone is found to be properly embraced, the "pince servante" is withdrawn; but should it be situated too far from the instrument, it is then seized by the small forceps, and brought within the four branches.

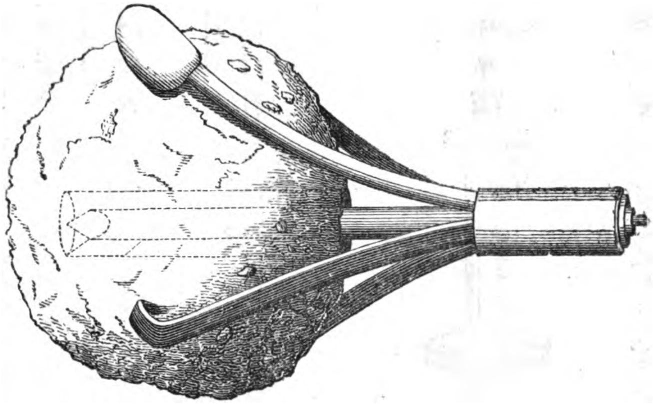
The following figure shews the "pince servante" conveying the stone between the branches of the instrument.

No. 27.



It is seen that when the calculus is well placed within the grasp of the instrument, the branch with a *hooded end* is made to protrude to the level of the other three, and the stone when maintained by the four hooked extremities, cannot move in any direction.

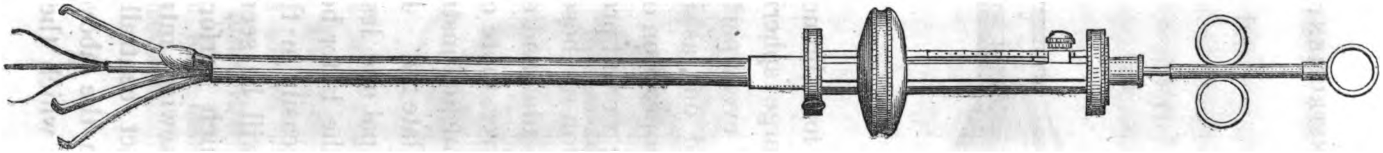
No. 28.



In the above wood-cut the four branched instrument is viewed grasping a large spherical calculus. The action and office of every part of this instrument having been pointed out, as it takes place at the earlier stage of the operation of lithotripsy—that of seizing the stone; we will proceed to the demonstration and description of those agents which are to act upon the calculus and effect its pulverization. To render, however, more clear the *modus operandi* of the four branched-instrument, we will first refer the reader to plate 29. He will there see at full length the principal and lesser forceps in their relative position; the latter being introduced through, and playing easily in the central canal of the former. It will be seen afterwards that the implements which perforate and excavate the calculus, are likewise introduced through the implements, and act centrally upon the stone. The dotted lines in the above plate give an idea of the manner in which the perforation takes place.

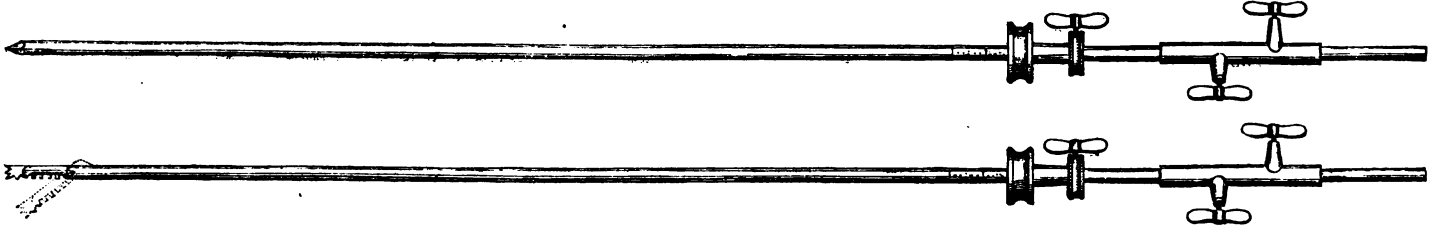
The principal tenaculum and the "pince servante" acting together present this appearance.

No. 29.



No. 30.

Perforator and Excavator.

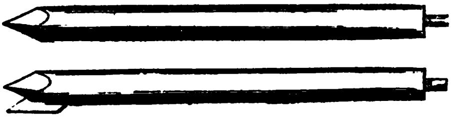


When the calculus is firmly fixed the excavation of the stone is accomplished by means of two instruments—the one is called a *perforator*, and the other an *excavator*, or scooper, (évideur) as seen above.

These are seen to be two long metal rods, on each of which is placed a pulley, fixed or moveable at pleasure; the object of the latter is to give the instrument the rotatory motion necessary for its effect, by the use of a drill-bow.

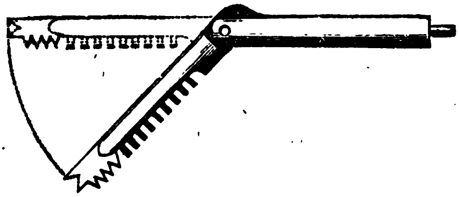
By means of two screws that are seen at the handle, a small blade can be pushed out from the extremity of the perforator; this perforator, as before observed, is adapted to be introduced through the central canal of the main forceps. The figure below shews this blade withdrawn into, and protruding from the extremity of the instrument.

No. 31.



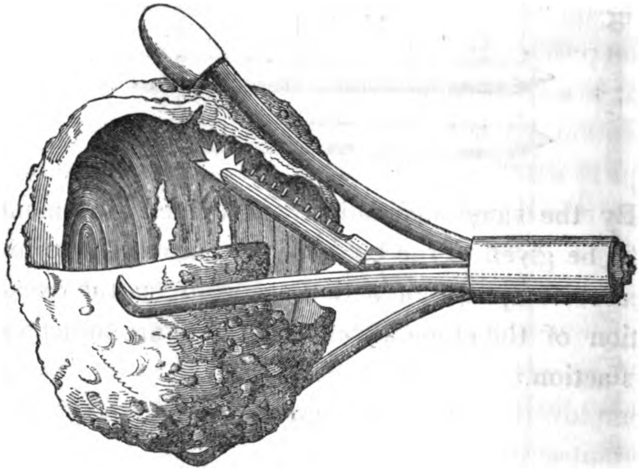
By the same mechanism an inclined movement may be given to the blade of the excavator, to increase its sphere of action according as the excavation of the stone advances—the figure indicates this action.

No. 32.



The first step after the stone was well secured was to make a hole in it down to a certain depth, which was shown by particular graduated marks upon the instruments; this hole, represented in dotted lines, can be followed in the figure that we have before represented, (fig. 28.) When the perforation is carried to its proper extent, the drill is withdrawn, and the excavator is introduced immediately after;—this hole was enlarged by progressively inclining the blade, until the stone was reduced to a mere shell, as the following design will shew.

No. 33.



That being done, a metal rod was introduced in the place of the excavator and the bottom of the shell was struck,—care being taken to regulate the blows given by restraining the rod to a proper depth; so that there should be no possibility of its injuring the bladder, although it reached the bottom of the excavated stone. The calculous shell, by this percussion, fell into the bladder in large concave fragments.

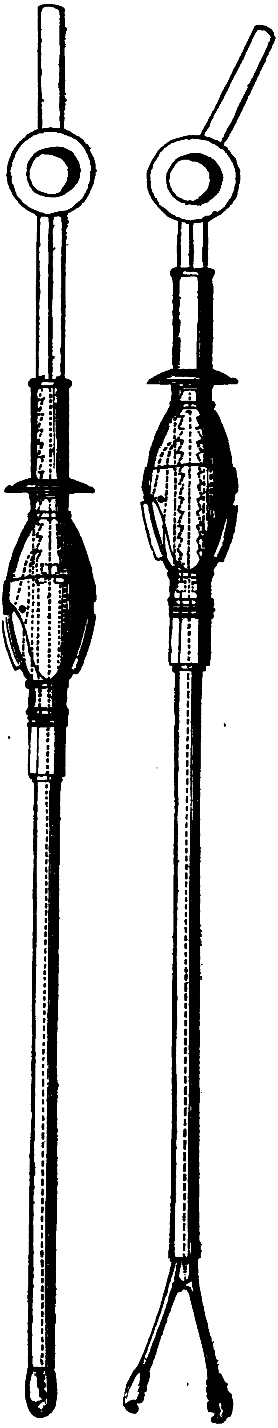
Baron Heurteloup presented the *rectangular bed* and *four branched instrument* to the Academy of Sciences of Paris, after having used them publicly in the Hôtel Dieu, upon a patient whom he cured.

The Academy of Sciences appointed a Committee, before whose members the apparatus was again used upon another patient, who was likewise cured, and being satisfied they decreed him a reward "for having very ingeniously perfected the instruments for the pulverization of calculi in the bladder."

But it soon became evident that this method of excavation did not render the operation quicker, except in cases of round stones, or such, at least as approximated very nearly to this form;—in fact, it could not have an advantageous effect, except when the stone presented nearly equal radii to the excentric action of the excavator. Since stones of this form are not the most commonly met with, the employment of this instrument must of course be circumscribed.

Baron Heurteloup then resumed his researches—directed them more particularly to the flat and oval calculi, and especially to the concave fragments which resulted from the application of the excavating instruments.

His mechanical genius very soon solved the new problem his judgment and experience had proposed. If, on the one hand, he saw that a spherical stone was best seized by a forceps clutching it by four opposed points of support—he no less discovered that the best manner of managing a flat or an oval-flat calculus, was to employ an instrument having two branches which might be applied to the two plane surfaces of the foreign body. He thought that if he could seize a flat stone, or a flat fragment betwixt two branches of an instrument, and could close them with great force, they would comminute the calculus, or the fragment of calculus placed within their grasp. It was to arrive at this important end, that the instrument called "brise coque" (shell-breaker) was contrived; a name



No. 34.—*Baron Heurteloup's Brise Coque closed and open.*

arising from the predominant idea that led to its construction; which was to break up the fragments resulting from the action of the excavating instruments, and which had the shape of egg-shells.—(See No. 34.)

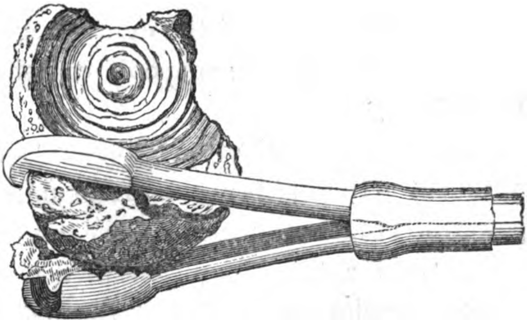
The reader here sees that the " Brise Coque " is an instrument acting by pressure, and composed of two powerful branches, which can be drawn with great force into a tube by means of a click and spring work, analogous to that of the instrument proposed by M. Amussat.

By means of the stem of metal which is seen at the extremity furthest from the branches, and which may be alternately inclined from right to left, one may project from the tube, expand, and close upon the stone with surprising force the branches of the instrument.

Drawn by means of the spring and click-work within the tube, the branches approach each other insensibly, and by an alternate and grinding movement, analogous to that of the jaws; they break and pulverize the fragments interposed.

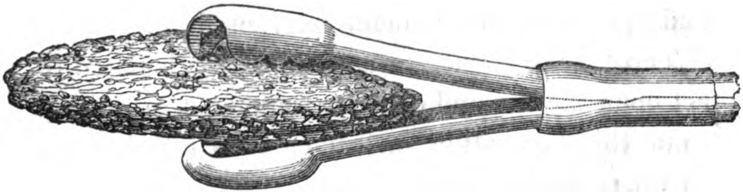
The " brise coque " was peculiarly calculated to act upon the flat and concave fragments, resulting from the excavating instruments, as may be seen by the following figure.

No. 35.



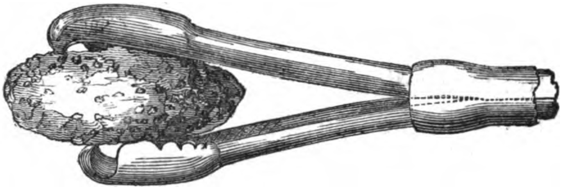
Upon flattened oval stones its action was also powerful; for the two branches applied to each of the surfaces were admirably calculated to crush these bodies, which neither the instrument with three branches of M. Leroy and M. Civiale; nor the instrument with four branches of M. Heurteloup could attack with success. By examining the sketch this will be readily understood.

No. 36.



When the stone was small, that is to say in proportion to the separation of the branches of the "Brise Coque," the pulverization must necessarily have been infinitely more rapid than with the three branched instrument, as may be supposed from the annexed wood cut.

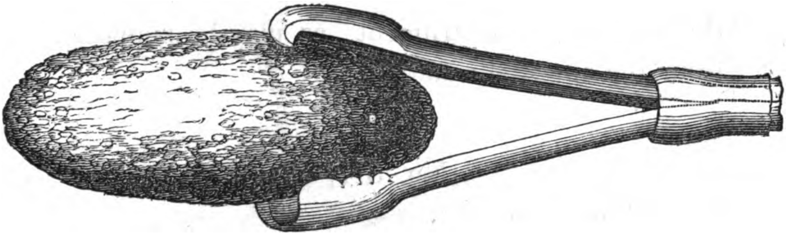
No. 37.



But when the stone exceeded a certain diameter, the "Brise Coque" was no longer of so much efficacy. In addition to the limited opening of the branches not permitting the larger of this description of calculi to be fairly grasped, it is evident that the power of comminuting would decrease in proportion to the separation of the branches—at the same time that the stone would present more resistance from its size.

This will be understood by inspecting the following diagram of the "Brise Coque," whilst embracing an oval stone of a large diameter.

No. 38.



Baron Heurteloup also presented his *Brise Coque* instrument to the Parisian Academy of Sciences, and practised operations before the Committee, which was appointed to examine this new fruit of his inventive industry. The first prize of surgery, for the year 1828, was awarded to him as a well-merited guerdon.

Although the several means which we have just detailed, had considerably augmented the remedial treasures of Lithotripsy, the able inventor thought that still more energetic mechanical agents might be discovered. Whilst operating with the excavating, or with the three-branched perforating instrument, M. Heurteloup had observed that when he *struck* the imprisoned calculous fragment with the central stems, instead of whirling them round by means of the bow, the effect produced was as great as it was rapid. In some cases he succeeded in curing the patients by merely striking the stone into fragments by the percussion of the drill of the three branched instrument. These facts had not lead to any important result, when a particular case revealed to him that which was to point out an invention of the greatest moment.

Operating upon a patient in the Greenwich Hospital, under the auspices of Sir Richard Dobson, he commenced by excavating the stone with the four branched instrument. As it was very hard, and did not partake much of the spherical form, the instrument having reached the utmost point of the external surface of the stone, there its action ceased ; and the calculus thus excavated, was left in the bladder. The operator, desirous of comminuting it, and finding it too voluminous, to be embraced by the *shell breaker* (brise coque) employed the three-branched perforating instrument. Several holes were made, but he could not succeed in breaking up the stone; for, after the action of the instrument had been repeated several times, whenever it was laid hold of, the drill, instead of making a fresh hole, entered again one of those previously effected, and the operation was illusory.

At last, convinced that he could not effect the comminution of the stone by perforation, it occurred to him, to try the effect of percussion, by striking the stem of the drill as soon as the stone could be seized in a favourable direction. The above idea was put in practice by means of a contrivance purposely devised for the occasion, which had for its object, to prevent the branches of the instrument from separating, whilst the stone was struck. Having by this means comminuted the stone, the operation was happily terminated by the *brise coque*.

We will proceed in the next chapter to point out the important results derived from the case just described.

CHAPTER V.

RECENT AND MOST SUCCESSFUL INVENTIONS IN LITHOTRIPTIC ART.

LITHOTRIPSY makes here so great a stride of improvement that a new era, altogether, begins from this time.

By some of the most distinguished surgeons of this and other countries, the instruments we are going to describe are considered to constitute of themselves Lithotripsy—preserving only the accessary apparatus of rectangular bed, &c. And although the first instruments we shall record in this chapter possess so universal a character for efficacy, the last invented modification, we shall describe, surpasses even these. Although so simple in its construction it is the climax of invention in this branch of art.*

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* We allude to the instrument by which the stone is broken, and such a quantity of its substance removed at one and the same time, as would of itself form a calculus as large as those for which

The operation described in the last chapter, which had required a great degree of force in the percussion employed, convinced M. Heurteloup that stones might be pulverized in the human bladder by the most immediate energetic means—as for example, by the brute force of a hammer; and that it might be substituted in lieu of the more tedious and less energetic means of drilling, &c.

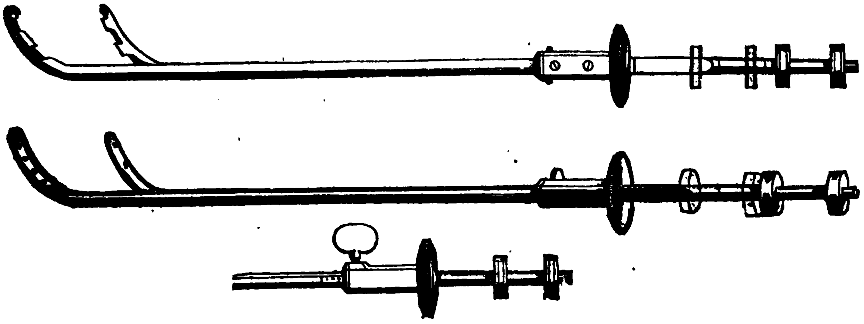
To arrive at a satisfactory result in this new train of investigation, he began by inquiring within his own mind, what was the essential character of percussion? He found that it consisted in the instantaneous approximation, and by succussion, of

the operation of Lithotomy has frequently been performed. This modification of the percuteur is so recent as not to be mentioned in the work describing "All the Methods of removing Calculus," just published by Dr. Civiale, and which has only reached us when the last sheets of this book were going to the press. Dr. Civiale, the able champion of a rival process of Lithotripsy, which its juniors have shorn of some of its splendour, acknowledges, however reluctantly, part of the merit of this percuteur. The jealous opposition of this distinguished Lithotriptist takes its last refuge in arguments directed against the use of this instrument in the last stage of Lithotripsy. The recent invention mentioned above, in admitting his arguments to be well founded, has levelled to the ground this last stronghold of his resistance. As regards the feelings which have so great a share in this opposition, they should cease on the reflection that the more recent inventions in Lithotripsy, do not at all diminish the merit of the earlier inventions; which, we are sure, will hand down the names of their authors to the latest posterity.

two planes: of which one was moveable, the other immoveable—approximation which tended to comminute rapidly the body interposed. He saw likewise that the more the planes were extended in length and breadth, the more the pulverization of the body interposed betwixt them would be effectual. It was in these two principles that he sought the basis of the instrument which he constructed to pulverise the stone by *percussion*, and which he named ' percuteur " (percussor.)*

No. 39.

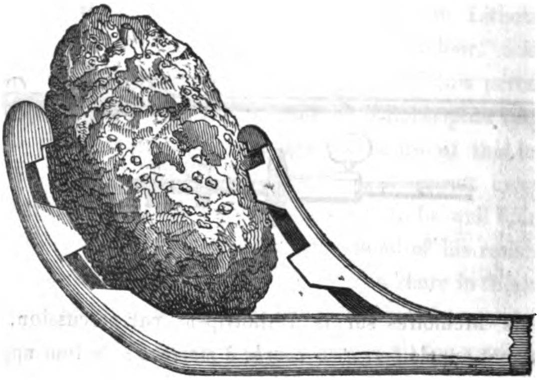
Baron Heurteloup's Percuteur, (percussor.)



* Vide Mémoires sur la Lithotripsie par percussion, et sur l'instrument appelé *percuteur courbe à marteau*; le tout appuyé de nombreux exemples de guérison, présenté à l'Académie des Sciences. Par le Baron Heurteloup. *Paris*. 1833.

He established it in two planes which are formed by the two curves seen in the above figure. As it was necessary that they should approach one another when in the bladder, the instrument is so devised, that each of these curved planes are continued into a straight stem, which was rendered indispensable by the necessity of passing the instrument through the urethra. It is therefore seen that the *percussor* like the *recto-curvilinear sound* is formed of a straight and a curved portion; and that the two parts separate from one another on drawing back that stem with which the moveable plane is connected. The following design shews the stone interposed betwixt the two separate planes.

No. 40.



Of course it follows that if the plane which is at the extremity of the instrument is immoveable, the stone must be crushed when the moveable plane is impelled upon it by sufficient percussion. The blows of the hammer separate the layers that form the stone and make it fall to pieces for reasons given in a former chapter.

From this it likewise results, that the great object is to give an absolute immobility to the posterior plane, and this is effected by means of the rectangular bed, and of the "fixed point" or support before described;—so effectually is this accomplished, that many patients do not express even the least sensation of pain during the percussion.

However extraordinary this may appear, it stands to reason that it should be so, since the part of the instrument which embraces the stone is placed, by the contrivance, in the middle of the water by which the operator has previously distended the bladder.

Hear on this subject the irrefragable evidence a distinguished physician operated upon with Baron Heurteloup's instruments, by a surgeon of European fame, Graefe of Berlin.

"The stone seized with equal ability and promptitude, the lithometer, indicated to be of 15 lines thickness. Fresh ebullition of happiness on my part at this news! It was almost with rapture that I heard the report of the blows of the hammer which broke the stone. Although so extremely hard was it that it required twenty strokes to rupture it.*

"At these words I think I hear you, my dear colleague, exclaim on the brutality of a method, of operating, which resembles the roughest of the mechanical arts. Be not deceived; *it is noise without pain; but not without result,* which the hammer produces. Remember the injection made previously into the bladder. It is in the centre of this liquid, far from the parietes of that organ, that this "scène" takes place, which is in appearance so brutal. I repeat: it is noise without pain, and nothing more, &c., &c.†

To judge by what we have seen in the operation under ordinary circumstances a minute or two at most, are sufficient to enable one to seize the stone with the *percuteur*, and to place the instrument in the fixed support and crush the stone. By this statement may be imagined how rapidly a cure may be accomplished.

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* The distinguished surgeon who performed the above operation, still so recent in practice, probably did not venture, from want of experience, to have recourse at once to energetic percussion. We have generally seen a stone require very few blows before it gave way.

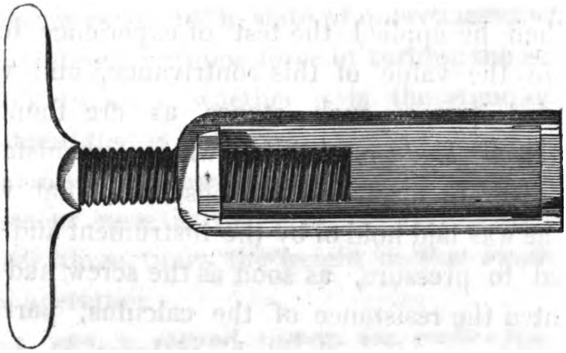
† Translation of a passage of—Lettre du Dr. Bigel au chevalier de Castro M. D., sur l'effet des eaux de Carlsbad sur les derniers fragments d'un calcul, &c. *Prague*, 1836.

When this instrument, closed, is introduced into, or withdrawn from the bladder, it gives no more pain than a common catheter, having all the external qualities of the last named instrument.

When success had attended the operation with the hammer, M. Heurteloup reflected, that perhaps the same instrument to which it was applied might be employed with advantage to break the stone by bringing together forcibly the two planes by means of pressure or compression. To effect these slow and gradual movements, he invented an instrument which he called "compresseur volant" i. e. moveable or flying compressor.

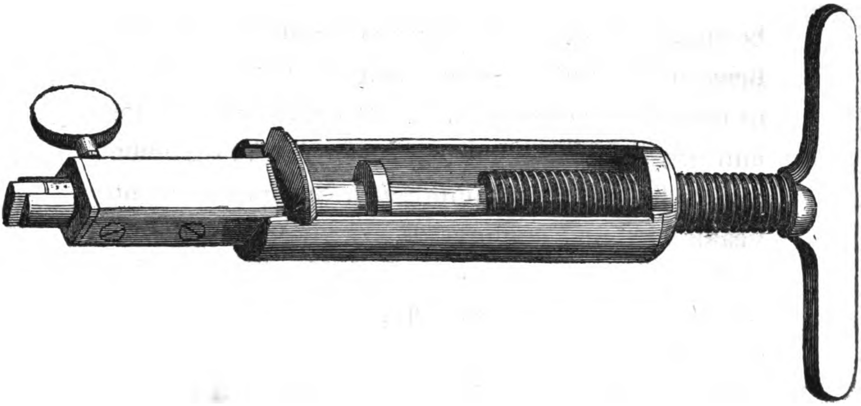
No. 41.

Compresseur volant.



He adapted this instrument to his percussor so that the extremity of the screw here seen should correspond to the extremity of the stem which communicates with the moveable branch of the *percussor;* the latter is seen below applied to the compressor.

No 42.



When he applied the test of experience to ascertain the value of this contrivance, and when he tried it upon such stones as are found in the *human bladder*, the following circumstances presented themselves. He observed, that when a stone was laid hold of by the instrument and submitted to pressure, as soon as the screw had surmounted the resistance of the calculus, particles were driven off with such violence as might occasionally be dangerous for the bladder.

With percussion, on the contrary, when suitably applied, the laminæ of the stone were loosened and gradually separated; the particles falling gently without being projected.

Such was the first reason for which Baron Heurteloup preferred percussion.

Afterwards he discovered that pressure gave him no exact indication, of the hardness and nature of the stone. Percussion on the other hand by the sound and resistance revealed the degree of compactness of the calculous body, and enabled him to regulate the play of his instrument accordingly.

In the operation by compression, the calculus, compressed by the screw, gave way when it was sufficiently soft; but the instrument warped or broke when it was too hard. Hence it will be readily understood why compression appeared a dangerous process to this operator. The operation taking place *out of sight* in the bladder, it is most distressing to be in a state of uncertainty, whilst accumulating force upon force by turning the screw, and not to know whether it is the stone or the instrument that is giving way under the hand. In employing percussion full security is felt, since the instrument, now, is tried previously by blows of a hammer three times the weight of that employed in the operation.

This was a second reason for eschewing the screw. But ultimately, it was found out likewise that the resistance augmented in proportion as the pressure increased, and that when the branches were but one or two lines apart, the calculous residue remaining betwixt them, became of such hardness that it threatened the breaking of the instrument, which was frequently warped under such circumstances. Here was then a difficulty, often an impossibility, of withdrawing an instrument considerably augmented in its volume by the fragments interposed betwixt its branches.

The only alternative left on such an emergency being either to make an incision to bring out the instrument, or to perforate and tear the membranes by using force; so that urinary infiltration or even death might ensue.

This last motive decided the Baron to reject altogether the operation by compression—not that pressure might not sometimes succeed in producing a cure, but for the palpable reason that it is against conscience to expose patients without absolute necessity to real danger.

A motive no less urgent, is, that percussion is more speedy and less painful than compression—setting aside the other objections to its use.

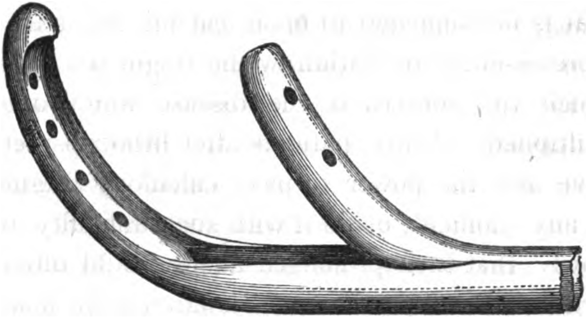
These arguments relate to the power of breaking down calculi by the two different plans; but another still more important consideration presented itself to justify the above conclusions.

Even, when the virtue had been conferred on Lithotriptic instruments, of reducing securely, and speedily pulverising a calculus, this important operation was still imperfect.

It is not sufficient to break calculi, but it is still more essential to withdraw the fragments without which the sources of the disease would only be multiplied. Many patients after lithotripsy either have not the power to pass calculous fragments of any moment, or do it with such difficulty, or so slowly, that their prolonged abode would often determine violent pain or inflammation of the bladder, compromising the success of the operation, or even life itself. Under such circumstances lithotripsy would be far from being sufficient in its means of relief, and we must feel that a plan which would remove such serious objections, would be highly valuable and would give to this branch of the healing art at least as beneficial an impulse as that imparted by the discovery of the percussor. It was the primary and fundamental idea of percussion which led Baron Heurteloup to this desirable result.

Instead of arming the extremity of the branches of the percussor with teeth, which are necessary when your object is to pulverize (teeth of which may be said *en passant* the disposition is not an indifferent matter,) he had the surfaces excavated so as to assume a spoon-like form.

No. 43.



When a fragment is caught, a few blows of the hammer given cautiously and judiciously force the superabundant portion of the calculous particles out at the side of the instrument, and through the holes placed in the hollows of the spoon. When these spoons are full of stone and are *completely closed* over the fragments, the instrument is withdrawn with its burthen as rapidly as it was introduced when empty. As the quantity of stone withdrawn at one time is considerable even in an ordinary sized instrument, the valuable result is attained, of both breaking and of withdrawing instantaneously by the natural passages a stone of a certain size, as is done in lithotomy—except that the former operation demands no aid of the knife and that most frequently during the course of its application, the patient is not prevented from following his ordinary avocations.

To extract the stone from the bladder with the greatest rapidity, is the most advantageous circumstance that can be sought for in the application of mechanical means;—therefore, this last device of the inventor, has solved completely the most philanthropic and important problem in the art of curing calculous patients. Not only avoiding the dangers and suffering of lithotomy, but likewise those which must sometimes attend lithotripsy itself.—It must be confessed that the latter when only consisting in the action of crushing the stone in the bladder was in a great degree an incomplete and unsatisfactory operation—no doubt preferable in some cases to litothomy, but which was not unaccompanied by its peculiar perils.*

And now to return once more to the operation by compression—by referring to the reasons elsewhere given it will become immediately manifest that success by means of a screw was incompatible with the action of moulding betwixt the two spoon-like extremities, the interposed fragment and withdrawing it with safety—a circumstance from which results for the patient the necessity of expelling the fragment, which it is often impossible for him to accomplish, and in the execution of which he will find little and sometimes no assistance from the use of catheters. The patient left to his own resources, after the comminution of the stone, would either remain uncured, or be a prey to serious morbid evils, such are inflammation of the bladder,—spasmodic contractions of the viscus—irritation from sympathy of the kidneys,—arrestation of fragments in the neck of the bladder or urethra from which they must be removed by operations, &c., &c.

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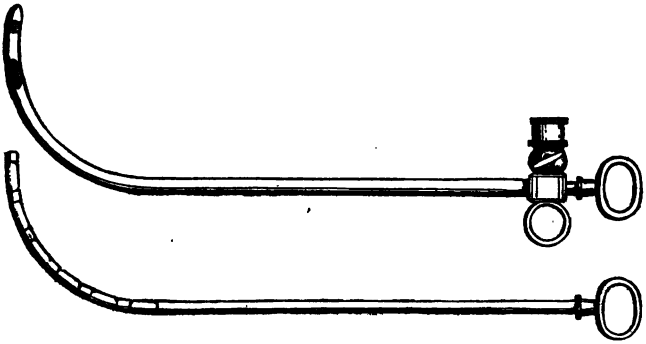
* In examining the reports of operations performed abroad by inexperienced operators, by far the greater proportion of those which proved unsatisfactory are seen to have arisen from the patient having been left to the unaided powers of nature to void the larger fragments of the broken stone. Generally some large fragments have got into the first portion of the urethra and no further—and there was been neither the special tact or special instrument to relieve the patient, without resorting to lithotomy.

Before employing the instrument last referred to (the spoon percussor) by which extraction of calculus is so much facilitated, the *sonde évacuatrice* evacuating sound, was used to attain this end as far as possible. On some occasions this instrument is still employed; we therefore think it necessary to give a description of it, although we do not entertain an idea of giving a complete account of all Baron Heurteloup's, no more than of any other person's mechanical resources, particularly such as are employed only in cases which are out of the usual course of things.

The evacuating sound consists of a curved canula in which a metallic rod is introduced, the extremity of which is formed by several articulated joints which allow of its bending to adapt itself to the curve of the canula.

No. 44.

Evacuating catheter.



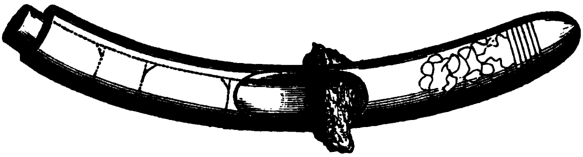
This canula at an inch and a half from its extremity, has two large openings placed exactly opposite to one another. The extremity is formed by a sort of thimble which screws on and off at will.

At the external end is a little apparatus to admit of injecting water, and of preventing, or allowing it to flow out according to circumstances.

When fragments require to be withdrawn from the bladder, the instrument is introduced with its jointed stilet. Having reached the bladder, this stilet is withdrawn, and water is injected, which is allowed to flow out, carrying with it the fragments in its current. If some portion of broken stone is too large, and is caught in the eyes of the catheter, instead of withdrawing the instrument which would have lacerated the urethra, the jointed stem was introduced, and by pressure against the fragment which was supported by the eyes of the sound, all the stone occupying the diameter or area of the instrument was driven into the cavity above the eyes; the remainder falls in small pieces which afterwards pass through the catheter.

No. 45.

This figure represents a fragment in the catheter about to be broken, and forced up into the magazine by the stilet.



When this space which the inventor called the *magazine*, was filled, the instrument was withdrawn, and by unscrewing the thimble-like portion, the fragments were removed from it with the jointed stilet.

This instrument withdraws frequently a large quantity of detritus. But on other occasions its use was nugatory; it fatigued very much the patient: and, besides, could only be serviceable when a large quantity of water could be injected into the bladder, which is far from being always either admissible or possible.

The ministry of this instrument, therefore, has been nearly abandoned; it was of use before the invention of Lithocenosis* by percussion, which we have described; but compared with the latter it appears ineffectual and dangerous.

Such are the series and concatenation of the inventions of Baron Heurteloup, forming a system of real Baconic induction.† Their elicitation occupied nearly twelve years, which an expenditure of several thousand pounds naturally attended.

Their interesting progression is manifest : each discovery generated, as it were, by its predecessor, and all fruit of deep thought, in one whose mind was stimulated by the conviction of their necessity. Their ultimate perfection is due to constant observation, and to the lessons of experience. One is at a loss which to admire most, the fruitfulness of invention, or, the persevering and determined will which enabled their author to overcome all the obstacles which beset his path, in an investigation of such novelty and magnitude in the healing art. Let the reader bear in mind, whilst estimating the difficulty of such a pursuit, that experiments are not to be tried here as in the invention of any other machinery—where the question is merely how an ingenious apparatus may be made to act upon inanimate matter. Lithotriptic instruments, devised for the relief of the living man, cannot be tried upon him when imperfect, without exposing him to death, and the operator to remorse and ruin. What command of mind, what dexterity of hand, what fecundity of resources ought not that man to possess who ventures on so dangerous an undertaking!

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* This word signifying the evacuation of the stone from the bladder, is derived from the Greek words—λιθος, *stone;* and *κενωςις, evacuation.*

† We cannot terminate this laconic description of instruments of such varied nature and power, without acknowledging how much we have been indebted in defining them to Mr. T. Biggs. This gentleman, possessed of one of those clear intellects so well adapted to the study of mechanical inventions, has acquired from the fountain head, a knowledge and a facility in using the Lithotriptic instruments, which merit our warmest eulogium. We have no doubt that these acquirements will, in due time, bear their fruit, and render their possessor a distinguished ornament of the art which has been so long the object of his predilection.

By most persons who have applied themselves to this subject, the dangers to themselves, and above all, to patients, have only been suspected when too late. Fortune has smiled upon their first perilous essays (as she has often been seen to have done for a time in the history of medical science on the most dangerous practices of every age,) but soon lamentable disasters have occurred. The fatal results which have arisen from persons practising with Lithotriptic instruments, who thought they might be handled like any other common instrument, without exclusive devotion to the study for a due time, have heaped upon Lithotripsy opprobrium and disgrace. These she has now shaken off, as easily as one who has slept beneath the shadow of a tree does the blighted leaves which have fallen on him, whilst he was entranced.

On the succession of inventions of Baron Heurteloup, which we have selected amidst his numerous devices, we have but one more observation to make—which is, that they form a complete system. This, with the circumstance of Lithotripsy in England, as we said before, being mostly confined to the use of his apparatus, are our motives for confining ourselves principally to his discoveries. If we mention others, but in a very laconic manner, in this our limited space, we are still very far from wishing to refuse them their due meed of praise.

As for ourselves, we have been moved both for the love of the art of Lithotripsy itself, and by a sense of duty to Baron Heurteloup, to uphold his great share in its invention. Contrary to what has been the case with many other inventors, particularly in this branch of art, his process has been open to the study of every medical man—his operations performed in private practice before his brethren—in hospitals, before the whole world. And as if this were not enough, all men of respectability who have sought him in his privacy, have had opportunities of investigating every minutia—of putting questions—making captious objections to draw out information, &c. &c.—as we ourselves have done.

In this, therefore, we have had our personal share of obligation: we should be most happy to think that this day, by our poor efforts, we had repaid it—by contributing something to the fame and triumph of one, who, open to all fair objections of scientific and honourable men, has held on the even tenor of his way, silent amidst incessant attacks of mouth and pen dictated by ignorance, envy, and malice. Not unlike in this to the manner in which we see in nature, creatures of a nobler race and growth, move amidst the punier and snarling companions with which they are obliged to herd.

The misfortune is that you cannot deal as easily with the malignancy of petty enemies, as you do with underhand detractors. You quietly despise the latter until time awards justice; but the former, like musquitoes, with their skin deep wounds and eternal buzzing, distract your attention and delay your progress.

The least of the disadvantageous results accruing to a liberal man who imparts, without reserve, to others the unprotected invention on which his fortunes are built, is the number of clients which his brethren must take from him. The far more detrimental consequence is that to which we alluded to before; namely, that too many of the imitators thinking that they can go and do likewise *at once*, without commensurate study, as well as without the habit, the special dexterity, and fertility of resource of their prototype, discredit the art.

The enemies of Lithotripsy are principally to be found amongst men who have proceeded to operate themselves, with their budget of knowledge but "half made up, and that so rudely" that disastrous failures have ensued. Their whole bent now is, of course, to father upon Lithotripsy the offspring of their own temerity. Such, however, are not the sources we must refer to in forming our estimate of the advantages of Lithotripsy. Many contemporaries have invented instruments (another source of bitter enmity); happy are those who have tried theirs on the dead body and have laid them by, innocent of every thing, but a little negative and bloodless ingenuity. Amidst the number of those who have devoted themselves exclusively to this branch of art, how few have succeeded in giving anything more than the primordial type of any instrument enjoying reputation.

Among the numerous mechanical contrivances that have been invented or applied, we conceive, after much deliberation and full investigation of many proofs that *percussion* is the only admissible operation in all ordinary cases of lithotripsy, as being so much the more preferable in every respect; and especially as being, with its greater efficacy, devoid of the danger attending the pressure screw.

Percussion, we repeat, we consider the triumph of the said art.* Desirous, consequently, of giving irrefragable evidence of the benefits of percussion in Lithotripsy, we have industriously sought for well authenticated instances of cure. Such instances we consider to be more especially those, where men at an advanced period of human existence—with both the effects of the disease, and the still more deteriorating effects of time visible in their frames—have submitted to percussion; and dying in course of time, some years afterwards of *other* diseases, have been examined by *other* surgeons at a distance, and without the knowledge of the lithotriptic operator. Such triumphant evidence the reader will find in the Appendix.

But next comes the question of dealing due meed of praise to those who first made the approaches to the invention of the form of the *body* of the lithotriptic instrument in question. Several persons, if we reason from the highly respectable contending evidence, thought of it at the same time. However, we beg to mention those whose pretensions, by a feeling of reserve which so often accompanies real merit (would it did always) have not been brought forward. By referring to the Appendix, it will also be seen that Dr. Haygarth, in the early part of the year 1825, first thought of this sort of split catheter with a receding stem, to take up stones in order to extract them entire—and that Mr. Hodgson (a name of note in medical literature,) imagined to adapt this instrument to the comminution of vesical calculi, by applying to it, and making it act by the power of a screw. In addition to this, Mr. Hodgson tried it before witnesses, in 1825, at the hospital in Birmingham. (Vide letters in Appendix.)

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* It was but a short time back that a distinguished Tuscan Professor, Dr. Vannoni, who visited this and other countries, by order of the Grand Duke, to ascertain the improvements of medical science, told us that one of the first Lithotriptists, of continental reputation, had performed the operation at Florence with the *percuteur;* although after devising and using for many years, other instruments to which he owed fortune and fame.

CHAPTER VI.

RELATIVE MERITS OF LITHOTRIPSY AND LITHOTOMY.

The inventions of the few years past have already delivered a most interesting portion of mankind from the infliction of the knife in cases of calculous disease: with the additional aid of lithotripsy, women need perhaps never henceforward be submitted to incision. It is true that the proportion, which female patients bear to the mass of persons suffering from stone, is very small. But, on the other hand, another class of patients, young children, who suffer more frequently from this complaint than women do—even if they could not be relieved by lithotripsy, bear and recover much more easily after lithotomy than adults. Having no will or foresight of their own, they do not endure that worst of all the attendant sufferings, which arises from the previous knowledge of an ordeal to which you must submit by your own resolution. Both in this respect and in the greater difficulty of regenerating the incised parts, grown persons demand our earnest and compassionate consideration.

Such being the progress already made in the art of curing calculous diseases, should not those whom it behoves, strenuously endeavour to equalise the fate of all patients of this description — whatever their sex or age—cherish the least important of the new inventions relating to it, even were they as yet but in the bud, since we have already an indisputable example of a whole class of patients being already delivered by these means. To promote this object, we will in friendliness to both, discuss briefly the arguments which have been urged against lithotomy and lithotripsy— the latter must have of course our more especial care. We must, however, premise that the question of the comparative value of lithotripsy and lithothomy, cannot be fairly discussed before the public—first on account of the incompetency of such a tribunal, and next for fear of enlisting no the side of the milder process, the passions of the judges. With surgeons themselves, as regards their own personal situation, were they submitted to the ordeal, and as men of conscience as regards their patients, one of the principal arguments against lithotomy, is the severity of the operation—were it even divested of danger. But whatever may be the objections to the latter operation in these two respects they appear in an exaggerated form to the patient: it is easy to harrow up the feelings of a person suffering from stone, by describing the incidents of an operation by *incision*. To light up the prejudices of persons so situated against an operation so rapidly and ably performed, and which must ever remain one of the greatest though last resources of surgery, is a highly dangerous indiscretion. One of the great objections to lithotomy is the exaggerated fear with which it is approached, placing the patient in an unfavourable situation for a happy result. So important a circumstance is the state of mind of a patient previous to an operation, that, operations performed upon adults, against their inclination, number the most numerous failures. A mechanic who loses his limb in the civil hospital with the prospect of consequent indigence before him, will frequently perish, without any untoward event occurring; whilst the soldier reckoning on his country's gratitude and support, recovers though amputated roughly on the field of battle, and jolted afterwards for many a mile, without food and raiment, in a baggage waggon. We must therefore banish in our argument here, the adjuncts of pain and danger, which patients regard as attending upon *any* operation, as inseparably as the flow of blood upon a recent wound.

One of the arguments used against lithotripsy is the number of cases of failure, real, supposed, or *invented*, which it reckons since its discovery.

The fairness of this argument against one operation, and in favor of another may be easily appreciated, by bearing in mind the following considerations.

Lithotripsy as applied to practice, is but of yesterday. It is but just reduced to a system, and of course counts more failures in the struggle of its discovery and in its first applications, than it will probably meet again in the lapse of its practice for a century.* This argument against lithotripsy is like supposing in a man of mature age the defects of his uneducated childhood. It is as absurd as it is insidious. Lithotomy on the other hand, owns its spring in the earliest ages. Most of the famous surgeons of past times have engaged in disputation on the subject—each great author followed by a fry of lesser polemists—in proportion perhaps of ten or twenty tenders to each of the larger men of war. Its history is written in volumes that would of themselves form no diminutive library. Long after its first adoption so much was lithotomy in disrepute, that Hippocrates imposed upon his disciples an oath not to perform it !*

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* Amidst the many operations with the new and perfected instruments (to these alone we advert now), we know but of one case where an accident has occurred. This arose from the metal of the instrument warping. On this one case, long since elapsed, the changes have been rung incessantly. Like a stray sheep that has missed its way it has made more outcry than all the good flock that have kept the right path—and many a willing echo has aided with its deception. At the very day we are writing, there has been an endeavour to palm upon the public as a thing recently occurred a *réchauffé* of this accident, which has repeatedly been explained, and most satisfactorily by some of the first men of the profession. The strength of the instrument is now tried (before lithotripsy is performed) with a hammer of so great a weight, that an accident is no more likely than that a gun which has been well proved should burst in your hands when properly used. As we have just observed, we allude here but to the new and perfected instrument; but even with the many others of which we have demonstrated the imperfection and insecurity in the body of this work, a host of patients have been cured. You cannot travel in any part of France, or in the countries immediately adjacent without meeting persons restored by lithotriptic process.

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* M. Sanson, the colleague of Dupuytren at the Hôtel-Dieu, thus expressed his opinion of lithotomy but a few years back. This well known surgeon was one of the most decided opponents of lithotripsy.—The following was in our estimation an exaggerated opinion at the time, and would be in the highest degree unjust to that noble operation were it admitted now as a fair description :

" Malgré les travaux des hommes les plus célèbres, malgré le grand nombre des méthodes opératoires, l'opération de la taille est encore une des plus graves, disons mieux, une des plus dangereuses de la chirurgie, et nous nous écarterons peu de la vérité en disant que la guérison d'un malade adulte qui a subi cette opération, doit être regardée plutôt comme un événement heureux que comme un événement ordinaire."—*Extrait de la thèse de M. Sanson, d'après des faits recueillis à l'Hôtel-Dieu de Paris.*

Directing their thoughts towards those improvements, which have transformed surgery, from an art of unceasing cruelty, into a beneficial ministry of comparative gentleness, and requiring a distinguished degree of judgment and acumen, it is not astonishing that surgeons should, in all ages, have particularly turned their attention towards simplifying an operation, formerly so severe and dangerous as that of lithotomy. Even those persons who live without the pale of the surgical profession, would read with interest, the varying forms and fate of this operation and witness with astonishment all the great, and more frequently, abortive efforts made by medical men of every age and country towards the fulfilment of this desired object. The mere fact of a multiplicity of remedies being proposed and adopted in surgery as well as in medicine, is almost always a just criterion by which to decide of the comparative inefficacy of the means we possess.

Even until within a few years, notwithstanding great and decided improvements introduced into operations for the stone, fatal events have been frequent, serious mutilations have been still more often met with, and every surgeon, according to his national or private prejudices, or according to the fashion of the day, has wielded his *bistouri caché*, his cystotome, his blunt or sharp gorget, his scalpel, or his favourite knife, and has anathematized every other mode of performing lithotomy, but his own.* Still, in spite of all the labours of distinguished surgeons, in times not very remote, men comparatively ignorant, a monk or a country surgeon has arisen, whose success has beaten his superiors in science out of the field; and after his death, his triumph has been found to rest entirely on his personal qualifications—his process fallen into discredit.

This statement will suffice to shew the unfairness of the first argument against Lithotripsy we advert to, and we may pass on to others, avoiding the accusations of Lithotriptists against Lithotomists, which are grounded upon the greater fatality of Lithotomy.

As to the severity of the operation of Lithotripsy, we conceive how seldom it can merit such a name, when we see men after submitting to its process frequently drive or walk home, and many not intermit, even for a single day, their habitual avocations.

The introduction of Lithotrites is but the introduction of large catheters;† frequently, the large catheters, or large bougies are the least painful, as they are not liable to hitch upon the little secreting lacunæ of the urethra.

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* Essay on the Removal of the Stone. P. 3.

† Ainsi préparé, j'attendais avec anxieté l'introduction de l'instrument qui devait aller saisir la pierre; son diamêtre qui est de trois lignes se trouve en rapport avec celui de l'urètre. L'opérateur n'éprouva aucune difficulté, et je ne ressentis qu'une légère douleur."—Letter of Dr. Bigel describing the operation performed on him by Graefe, with Baron Heurteloup's instruments.

Even when the Lithotrites are required to be larger than ordinary instruments for the cure of stricture, still is the dilatation of the urethra, where necessary, gradually accomplished, as in the cure of that disease unfortunately but too common. As regards the play of the Lithotrite in the bladder, we have described the admirable apparatus employed to prevent pain, — as to the fragments which might remain in this organ, we have shewn that if the stone is small, they remain not long behind, or are removed at once. If, on the contrary, the stone is large, the extraction slower, the unfortunate patient, and the viscus itself, have, if we may so express ourselves, got accustomed to pain.

It would not be reasonable to suppose that the passage and movements of Lithotriptic instruments would produce any extraordinary pain in the urethra and bladder of persons long affected by stone. The former organ has been, we repeat, accustomed to the passage of gravel of large diameter and of acrid fluids ; the former has endured the presence of these irritants, and of a large foreign body. The first effect of mechanical injuries (on a sound structure) is to give exquisite pain arising from the surface upon which the bodies impinge. But when these irritating bodies continue daily their attacks, nature adopts every means imaginable, such as secretion of mucus and albumen, thickening of membrane, &c., to obtund the pain of the surface. At this stage it is rather in the deeper organs beneath daily more and more disorganized that the sufferings of the patient increase.* The sufferings, however, endured during abrupt and considerable motion of the body—in the jolting of a carriage, and under many other circumstances, occurring to persons labouring under stone, are ever recurring. It is the anguish of these pains, that drives patients at last to consent to be cut for the stone.

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* In many cases we have seen with no small surprise that where a stone has been broken, before the fragments have been removed, the patients have felt so greatly relieved from all the various sufferings attending calculus, that if they were not urged, they would not have sought any further means of extraction. This is against our pre-conceived notion, but well worthy the observation of surgeons who may be naturally prejudiced against the multiplication of stones by comminution, which would be supposed to irritate the parts by their uneven surfaces. That this relief should follow so immediately the first application of Lithotripsy, it must of course have been performed by a dexterous practised hand; otherwise the instrument will leave behind pain unjustly ascribed to the division of the calculus. The angles of the broken stone are probably removed by the slight solvent power urine (which we have previously alluded to) or depositions of fresh matter take place upon them which round their asperities.

Comparing Lithotripsy to Lithotomy with respect to pain (setting aside the incisions in the latter process) a Lithotrite is nothing more than another kind of forceps. The forceps in Lithotomy is introduced through the fresh wound, and when the stone is too large to come through it, a stone-breaker is introduced, such as the ingenious one devised by Mr. Earle. Le Cat, a surgeon, of no mean fame, in his own Augustan age, thought, and some of his compeers thought likewise, that he had devised a great improvement when he had made an opening through the perineum into the bladder, through which to break and withdraw the stone. What would he have thought of the process now applied, which effects the same object through the natural passages! A gentleman who had the stone five times, and who submitted once to Lithotomy and four times to Lithotripsy, said, that he preferred a sitting of Lithotripsy to one at the dentist's.* A man of such dire experience must be held to be a competent judge.

This case brings to mind how frequently the stone returns when once extracted from persons under the influence of the calculous diathesis or disposition.† Nor can one feel astonished that formerly, as in cases we have in our mind's eye, distinguished individuals have succumbed to the effects of the third or fourth operations by the knife, performed by some of the best surgeons of the age.

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* Rapport sur la Taille, &c. p. 61.

† The frequent return of the stone has been used as an argument against Lithotripsy, by assertions that *the new stone was the*

"Nec fibris requies datur ulla renatis."

It is only under the hands of such distinguished men, that the patients can be brought so far. The physical sufferings are in such cases overrated; but it is the moral agony and nervous agitation, at the approach of a new ordeal, that produce an inauspicious struggle and dangerous delay.

If the patient has recourse once more to Lithotripsy with regret, it is not with dismay. He knows well the symptoms which indicate the return of the calculus. Having no apprehension, he goes at once to the lithotriptist, when the stone will probably be speedily removed, instead of refraining in fear, until it has acquired larger

former one, or part of it left behind. Such hibernicisms, we see, are not despised—any argument will serve the turn of those whose very enmity to a good thing proves a distorted judgment. A gentleman complained that a Lithotriptist, whom he had handsomely paid, had left in his bladder a particle of stone, which was afterwards removed in a moment by another surgeon. He was naturally enough told that whether it was an old or a new portion of stone, he ought to spend his time in thankfulness to Providence, instead of reviling the discovery that had saved him from the knife. Ultimately it was found that he was constantly generating stones, the smaller of which sometimes escaped of themselves.

dimensions. We have seen patients return several times to be sounded, when they have only imagined they had a new stone. This is one of the great blessings of Lithotripsy, that once generally known, persons will be operated upon so early, that the stone will be small enough to be extracted at one sitting, or at worst easily removed, in the great majority of cases. As we have observed before, it is passing strange that so many calculi should be allowed to remain in the bladder till they have greatly increased, without the patient being aware of his state. This has been unsatisfactorily attempted to be explained, by the patients so often applying first to physicians, who do not habitually think of a surgical disease,* which is besides masked by the general indisposition or by irritation of the whole urinary system. There are cases where the calculous disease creeps on so insidiously, that the stone is of great magnitude before the patient's adviser can be aware of it; but fear is the ordinary cause of this evil.

The following well-known and extraordinary case aptly illustrates our previous assertions. It carries the more weight with it, as it is derived from one, who, by his profession, as well as by more than twenty years of cruel experience, was the fittest judge one could think of, to pronounce an opinion.

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* Vide Rapport sur la Taille, &c.

At a meeting of the Institute of France, on the 14th May, 1826, a paper was read by M. Clever de Maldigny, a military surgeon, in which he stated that he had been seven times afflicted with new stones, and had six times undergone lithotomy at the different ages of six, eight, eighteen, twenty, twenty-two and twenty-four years! The sixth time the stone was at the neck of the bladder, and the patient endured such agony that he took the desperate resolution of operating upon himself. For this, he placed a looking-glass between his legs, by which means he was able to direct the bistoury in the course of the former cicatrices, and having made a passage for the calculus, extracted it with his fingers—he dressed the wound, and soon after was perfectly well. On his having the seventh stone, however, he did not feel inclined again to lithotomise himself; he submitted to the Lithotriptic process, and was perfectly cured. He observed that, after a cure so prompt and easy, he would await with confidence another attack of his formidable complaint.

Before Lithotripsy was known, the patient was cut for the stone, either in a case, where its substance was so small, that it could be removed now in a few instants, or where it had been allowed to grow so large, that whilst the constitution was already affected, as must always be the case to a certain degree in a calculous patient, the parts themselves, with which the stone is in contact, and those adjacent were deeply diseased. Thus was an important operation performed on the one hand, in a broken constitution; on the other, parts were severed that were already diseased—that is to say, in the most unfit state for healing kindly. Now it is one of the first rules of surgery to avoid cutting into (not off) parts that are disorganized—and if we amputate a limb which is diseased, we sacrifice many inches to attain that point where healthy parts uncontaminated, as yet exist.

We have referred above to the circumstance of the smallness of calculi for which patients have been operated by lithotomy; so small have these bodies been found in some cases, that when the operation has been achieved no stone has been discovered—it had escaped in the blood, or in the water of the patient. Nor can it fail sometimes to occur that, in sounding the patient, a stone may be supposed to be felt distinctly — the operation consequently be performed—and no stone exist! Some morbid growth having played the part of the extraneous body that led to the operation; such cases are lamentable — distressing to the surgeon, agonizing to the patient !* It is needless to say, that such mistakes cannot often occur, or rather cannot lead to serious consequences in lithotripsy. The lithotrite cannot act upon *nothing*—the size of what it grasps is at once revealed, and measured by lines in the handle of the instrument—setting aside that a detritus must come away, when a stone is acted upon. Hence the use of the lithotrite for exploring.

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* Such cases may be found recorded in many authors; vide in the most recent work, Cross, on the Stone, page 56.—M. Roux, a distinguished French hospital surgeon, relates four such cases in his own practice. *Rapport sur la Taille, &c.*

To show how readily the lithotrite acts upon, and removes a small stone, a case has fallen beneath our notice lately, where the patient after a minute's endurance of the instrument, felt so little sensation and its magic was so rapid, that his mind became possessed by an opinion, that the whole affair was a mere jugglery, of which he had been the dupe. The remembrance of his having been sounded by several surgeons previous to the operation—the sight of the detritus of stone that had passed from him—and his presence at another equally rapid operation on another individual, brought home to his mind conviction, and congratulation at having, without suffering, escaped the knife.

It happens sometimes after the bladder has been laid open in lithotomy that the stone is too large to be removed—so it likewise occurs, though very rarely, in lithotripsy, that when a stone has been broken down, peculiar circumstances prevent the bringing it away. In such a case as the last, the patient can be relieved by lithotomy; and the disturbance of the organs by the manœuvres of the lithotriptist, is in fact compensated (however this doctrine may be opposed) by the diminution of the size of the calculus. For one of the great difficulties of lithotomy is to find, in a bone-bound region like the perineum, room to bring away the stone, without laceration of important organs : this shows that the rival operations should unite in a bond of amity, for the relief of suffering mankind. The question betwixt them is not merely which is the best, but rather in what circumstances, each is to be performed. Every day, of course, the number of patients that will prefer a bloodless operation, will increase. They will come early, being divested of the fear of an ordeal like lithotomy —which, although curing them in the majority of cases, still, they imagine, may send them in a few minutes before their Creator.

When the disease has been of short duration the result is always favorable, and the cases particularly adapted to lithotripsy. The greater proportion of cases, that now present themselves for the exercise of lithotripsy are the most unfavourable for any operation whatsoever. Although the lithotriptist would fain avoid during the struggle for ascendency under inimical and jealous eyes, all the risk he is exposed to in operating them, he has often no choice. The patients of course have generally applied first to those who practise lithotomy alone, and have always been submitted to the ordeal of many examinations, and sometimes to the awkward attempts at lithotripsy (when they have insisted on it) of reluctant surgeons, or of those who think that the talent comes not from study and experience, but from inspiration.

An objection has been raised against lithotripsy, grounded on its not being an operation that can be performed by every surgeon, and applied to every case. Lithotomy itself, if it has been until now the only resource of surgery, was so little applicable to every case, that it has been a subject of lamentation for ages; and to this circumstance are to be attributed, the interminable labours on this head—and finally the invention of lithotripsy itself. We have shewn that the latter had been sought for, for ages, under this impression, from the Egyptian dreamers, to the modern German and French discoverers.

As to the impossibility of finding men at the present moment, even in very large districts, capable of practising this new art, the objection is easily answered. The great operations of surgery, but particularly lithotomy, should never be performed under ordinary circumstances, but by the first rate hospital surgeons. It is only in such vast establishments that sufficient knowledge can be *securely sought*—otherwise " Experience in lithotomy, like victory in battle, is seldom attained without counting a certain number of slain."*

Lithotomy therefore is not very unlike lithotripsy in the difficulty of finding proper practitioners. But this art, which, being now only brought to a certain standard of perfection, is a sealed volume to the many, time and due study will develop to every student. Although, even in ages to come, persons may, as now, travel some hundreds of miles to submit to the magic touch of a great lithotriptist or lithotomist.

Nothing therefore is more futile than the objection just answered—setting aside that it would be no reason that those who can afford, and are within the reach of lithotripsy should not enjoy the consolatory remedy, because others are debarred by fortune and distance from its benefits. How many of the millions, who inhabit the earth, created by God with equal right to benefits, are debarred from all the advantages considered the most essential by the civilized man?

This objection is but as rational as that which has been raised against the use of the *rectangular bed* and the *fixed point*, we have elsewhere described. They were to be condemned, forsooth, because they entailed some expense and the necessity of transporting them;—as if the expense of a pound or two, and the trouble of conveying from one place to the other, an apparatus which, we hope, will soon be found in every hospital of the kingdom, should debar the unfortunate martyr from its inexpressible comfort, and the operation from its security.*

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* Cross, on Urinary Calculus, page 95.

But we have already over-stepped our limits and must leave untouched many supposed objections against, and still more numerous arguments for, the process we uphold, where it can fairly claim preeminence. "To cut short the argument," one of the great hospital surgeons observed to us the other day, "the only question for a surgeon to ask himself is, what operation he would submit to, were he afflicted with the stone: few men of good faith would answer otherwise than that he would resort to lithotripsy where the case had no remarkably unfavorable feature." Accordingly in England, as we have mentioned, every medical man who has been afflicted with calculus has, we believe, addressed himself to the lithotriptist—and every medical man who has resorted to this remedy for his own relief, bears testimony to its success. Since to mention these gentlemen's names, without their permission, would be indelicate, pass we on to the Medical Body in France—those of its members who have been operated upon, have publicly proclaimed their names for the benefit of humanity and science. Amongst the number of medical men who have submitted to lithotripsy, M. Lisfranc (perhaps the greatest operator in that country since the death of Dupuytren) M. Dubois, the most renowned of French lithotomists, and he who has operated upon most patients by the knife—have been relieved of calculus by lithotripsy.

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* Of course the percuteur, like any other instrument, might be used without the aforesaid apparatus,—if the surgeon is altogether deprived of the possibility of procuring the bed, which is the only case in which the screw would be at all admissible. We have before shewn and described the manner of applying to the *percuteur* pressure by means of a screw.

From the 26th April to the 2nd June 1835 (last year), the Académie de Médecine devoted its sittings to the public discussion of the relative merits of lithotomy and lithotripsy, and during this lapse of time, M. Lisfranc quitted the chair which he occupies as president, and descended into the lists to combat all comers.* Ultimately the most violent of his adversaries were compelled to acknowledge, that if they had the stone themselves, they would submit to the new process—only making certain reserves as to the nature of the case. Far be it from any man to recommend it, where it is unfavourable. Certainly no person can be more benefited than a medical man by such an invention as lithotripsy. A married man having children solely dependant upon his exertions, cannot even put up with the loss of time attendant upon the cure by incision—

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* The following passage from the debate is highly important: M. Lisfranc.—" M. Dubois et moi-même, nous étant soumis à la lithotritie, M. Velpeau a répondu que nous étions malades, et sujets aux illusions comme tous les malades; je puis lui

assurer cependant que nous n'étions pas dans le délire ; il s'agissait de nos individus, et nous y avons regardé, moi surtout, de très près. (On rit.) Alors j'avais déjà soutenu la supériorité de la lithotritie; mais je portais un calcul volumineux depuis dix-huit mois, et je tenais à m'assurer de toutes les chances de l'opération. Je compulsai tout ce qui avait été écrit sur la matière ; je pris des renseignements à domicile chez les personnes opérées ; de toute cette enquête, il résulta cette conviction pour moi ; que, la lithotritie ne doit pas être exclusivement employée, mais que dans la plupart des cas, elle est de beaucoup préférable à la taille. Je me fis donc lithotritier ; en dix séances, je fus débarrassé de mon calcul, *et me voilà !* Pour M. Dubois, nul practicien peut-être n'avait autant que lui pratiqué la taille, et avec autant de succès, ceux-là le savent qui connaissent sa grande réputation, ou qui ont suivi son excellente clinique ; et malgré tous ses succès, quand il a eu la pierre, il se l'est fait broyer, et il est bien portant aujourd'hui..... ..Boyer avait commencé par douter des avantages de la lithotritie, il les a formellement reconnus depuis ; dans la dernière édition de sa chirurgie, il la regarde comme un bienfait. C'est à la fin de sa carrière que Boyer a changé d'opinion, et depuis lors, MM. Jacobson et Heurteloup ont doublé au moins la valeur de la lithotritie."—*Vide Rapport sur la Taille.*

setting aside more serious considerations which we, advisedly, refrain to dwell upon.

It is worse than useless to rake up every untoward circumstance—the hazard of the die—that may possibly attend Lithotomy : to pourtray every sombre and unpleasing feature of a friend and saviour in the hour of need—in whom, then, we find a thousand good qualities hidden beneath his forbidding exterior—is in the highest degree unfair. But this course, we regret, has heretofore, in some degree, been forced upon the gentlest advocates of the new art, by its opponents condemning it without comprehending its bearing and resources, and proclaiming, as inseparable evils, either those defects that belonged to its youth and inexperience, or blazoning forth, as particularly Lithotriptic, and exaggerating, such evils as belong in common to both processes of cure. At the same time, we would not have it forgotten (for then we would only appear disguised enemies) that it is impossible to form any opinion of Lithotripsy, but in juxta-position to Lithotomy. Whilst we avoid all that can needlessly discredit the latter, and eschew the ridiculous efforts some have made to banish it altogether—nothing can be proved, unless the character of the old remedy to be partly supplanted, is not in some particulars shown up, and the superiority of the new one exhibited in its just place. Lithotripsy is destined to be an "imperium in imperio," to reign over by far the larger portion of the domain of Lithotomy—but still leaving to the formerly sole sovereign remedy a sufficient province to maintain itself in great honor.

CHAPTER VII.

THEORETICAL AND PRACTICAL CONSIDERATIONS—FALSE JUDGMENTS VENTURED, AND ACCIDENTS ARISING FROM WANT OF DUE INVESTIGATION—CONCLUDING OBSERVATIONS.

LITHOTRIPSY, like every other branch of medicine, consists of theory and practice: but if there is no good theory but that which arises from practice, on the other hand, theory is more wanted here to guide practice, than any where else, as one of the greatest questions is the nature of the mechanical powers employed—how they act—and how, and in what degree they should be applied.

We must now enter as briefly as possible into many details that appear indispensable even to the completeness of so small a volume. But these are mostly to be learnt in a proper school of lithotripsy—in clinical study;—until this is done — until instruments have been daily handled and examined, no one can be justified in operating — in acquiring, by repeated attempts at the expense of a living man, the experience which a deeply versed and practical professor of the art has acquired, and can in a great measure communicate. You must see him handle and use the instruments—behold with what sleight-of-hand he conveys a large instrument up to the goal, before you are—nay, even the patient, is aware of the fact. You must witness how the Lithotriptist adapts himself to his patient's position—tothe peculiarities of the case—and know why he singles this or that instrument he has brought either in expectation of anomalies and difficulties previously ascertained, or to meet the sudden and unexpected emergencies of the moment. Thus is learnt why the long-beaked instrument is employed for the mixed-phosphate stone— the short-curved one for the lithic acid and mulberry calculus—why the thick-bodied instrument is used to shatter the hard stone—the hollow-cupped one to crush, and, at the same time, withdraw the soft calculus, etc., etc.

We are aware that a monk has been said to have relieved himself of stone by the use of a small chisel—an uninitiated officer by the friction of a rough-backed stilet—hundreds have been cured by complicated and comparatively imperfect means; still the most gifted surgeon cannot take up the simplest of all lithotriptic instruments—the "percuteur," for example —and operate, with safety to the patient, without deep study—in spite of the most intimate knowledge of the organs he has to deal with.

In operations of this grave importance, patients are entitled to the utmost security that can be afforded them by the advance of art up to the very day the operation is performed. Is it sufficient for patients to know that eighty in a hundred can be cured by ordinary instruments, when their's may be one of the twenty fatal cases? The *percuteur* is very simple, as a principle;—the very first sight of its outward form is the harbinger of the miracles it can—it *does* accomplish. But in it is found lurking that inseparable leaven of imperfection of all sublunary things—of which we have the natural correctives in our minds—our application—our ingenuity. Therefore must we be able to handle the percuteur rather with an eye to detect all possible imperfections in its construction, than with a blind confidence in its simplicity:*—not with apprehension, which it is not calculated to inspire; but bearing in mind the vessel in which it is to act, with that prudence and foresight which enables the sailor to navigate the stormiest seas, inspired by the very knowledge that he is only separated from death by the thinnest partition.

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* We have seen a patient who had been operated on numberless times for two years with a lithotriptic instrument by a rising surgeon, justly esteemed a man of some note: symptoms of stone still remaining—the bladder much inflamed by the above applications. We should not mention such a case, which is besides innocuous, since the individual cannot be recognized, were it not that the surgeon, who operated on the patient, was one of those who inveighed, in no measured terms, against lithotripsy, and against

It is painful to hear how venturous most men are in giving an opinion on lithotripsy generally,—or in approving or condemning this or that lithotrite or process. Can they be aware of the latent difficulty and niceties of the subject?

In the simple instrument, mentioned above, every difference of a line will increase or diminish

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the operator who most successfully professes this humane art. Setting aside the more conscientious opponents of lithotripsy—whose motives and opinions we respect—the very few surgeons amongst men of standing and respectability who illiberally attack it, are most of them engaged in inventing something they may call their *own*—which they consider will be a much better expedient to obtain fame and fortune than pursuing and perfecting that which a longer experience has rendered secure. They inveigh against lithotripsy and lithotriptists; both the art and its professors are regardless of humanity—say they. But, as in the apocryphal story of the clergyman of the coast of Cornwall with his congregation at church, who, seeing his flock on the point of rushing out to pillage a vessel foundering on the coast, repressed their criminal ardour by animadversions on its immorality till getting to the church door, and drawing up his surplice he cried: "Let us start fair"—these bitter revilers of lithotripsy and lithotriptists are only waiting till their own conceptions have come to light, to engage in this most "inhuman practice."

its beneficial effects. When properly constructed, the operator may even lay hold gently of the coats of the bladder, when necessary, without pain, much less injury— and acquire thereby important information. The instrument unscrewed, the materials of its construction are first to be examined —what part is to be made of hard or of soft iron, or of steel; where strengthening bands are to be introduced; the angle at which the curved portion is to be united; how much it is to deviate from the straight line, etc. The branches must glide into, and from one another in the most oily manner, so to speak, at the slightest touch. The teeth must be disposed with such care, accuracy, and refined mechanism, as to act efficiently and rapidly on the calculus, but at the same time avoid the bladder. They must throw off, not retain, that portion of the shattered stone they cannot at once withdraw in their embrace—and then shut so hermetically, that the eye alone, not the touch, can discover where they sever when needed.

A surgeon prepared to operate must have cogent reasons for preferring this or that instrument, this or that lithotriptic process—even to the same instrument he may apply two different mechanical powers. He may prefer applying compression to the "percuteur," instead of the hammering its name implies. But he must understand what he is about: and must have good reasons to give for his choice. Setting aside other objections elsewhere stated, if he forgets that he has already applied that safer pressure, the already considerable power of pressure of his hands, and then employs the screw, which, with treacherous facility, obeys his touch, without conveying any idea of resistance—he accumulates a momentum, of which some dire event alone may give him the measure.* And this misfortune he may have encountered only to avoid the trouble of a more extensive apparatus, which enables the operator to crush the stone in the centre of the fluid introduced, without touching the patient's bladder—or from aversion to the apparent "brutum fulmen" of the hammer, which he forgets is regulated and measured by his hand, and with which he may tap so slight a blow as will not wake a sleeping infant. We have no notion by the above exemplification, of re-opening or influencing the previously discussed question of preference as to these two modes of operation, but merely to exemplify how hazardous are the sweeping opinions daily ventured on Lithotripsy—opinions perhaps formed upon the inspection of an instrument imitated from some drawing in a book out of date, or of one of the many that have found their way to the pawnbrokers (there keeping company with the innumerable lithotomes daily going and coming in fashion) cast off for slight deviation of form, perceptible only to the practised eye, and which we have mentioned as influencing so much the rapidity and success of the operation.*

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* We procured lately from M. Charriere one of the most justly reputed instrument-makers of Paris, the instrument of Dr. Jacobson, to have a wood-cut made from it for this book. A friend, examining its mode of action, broke it by the pressure of its screw. Still its power of resistance was much greater than it could have been had it held a stone in its clutches.—*Verbum sat.*

Whilst giving this exemplification of the insidious, violent, latent power of compression, from what has occurred with an instrument of Dr. Jacobson, we must make an "amende honourable" to its ingenious inventor. In a former chapter we said we did not know of any cases of cure effected by its instrumentality. Cases have since come to our knowledge, where cures are said to have been effected by a modification of the instrument in question. We cannot imagine how a stone of any size could be thus broken, and particularly its fragments removed; but it is but fair to state the report.—*Vide the last Work of Dr. Roy d'Etiole.*

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* The following passage, (alluding to Baron Heurteloup), written by a competent judge of the difficulty of such constructions, aptly describes the situation of an inventor in this branch of art—

" He spares neither labour nor expense in bringing his designs to perfection. In the course of his experiments, he must have accumulated a room full of instruments of every shape, for crushing the stone, which he has successively thrown aside. He can, therefore, duly appreciate the labour and ingenuity required in the invention of instruments, more particularly those in which are combined the most delicate formation, with great power."

(Extract from a letter, written by Mr Weiss, in the *Lancet*, and published, among other documents, to support his claims as the inventor of the *screw*-lithotrite.

The incorrectness of opinions generally prevailing amongst the opponents of Lithotripsy is still further shown by the imputation cast upon it of sometimes leaving behind fragments.* We must of necessity

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In expressing our opinion on the subject, we have referred, not only to the last pamphlet of this meritorious instrument-maker, but also to his former work with plates representing such various and ingenious devices. It is but just to recommend them to the perusal of persons interested in the subject, to place in comparison with the contending evidence.

* Before attributing to any operation for the stone the blame of leaving behind the materials which will demand a fresh operation, it is necessary to make a calculation of probabilities. You must take into consideration how frequently the stone returns—the advance of disease in the person operated—the intensity (if we may so express ourselves) of the calculous habit or diathesis—whether, on the one hand, the stone had its origin in a nucleus from the kidney, which organ still persists in its morbid disposition,—or, on the other hand, whether it proceeded from a degree of irritation or inflammation, which the use of instruments has left in the parietes of the bladder. You must likewise consider the diet and habits which the patient has followed since his recovery from the complaint. We have annexed, in our Appendix, a borrowed "table of the relapses of calculous diseases," to lead to a better judgment on the above subject. Besides an extraordinary instance of the return of stone, alluded to before, we have on record numberless other cases;—for example, Colot relates that a Benedictine monk was cut for the stone in his infancy; the operation was repeated when he was thirty years of age,—and Colot himself lithotomised him a third time, and extracted fifty calculi. For two years he enjoyed pretty good health; but shortly after, fresh stones were detected on sounding:—he was not then, however, in a fit condition to undergo the operation. His death soon followed—but

here again compare the rival operations: of course nothing conclusive can be come to without this comparison. We must ever bear in mind what would be

for three months previous to it, he did not void a single drop of water—nay, had not so much as felt the desire, and was quite free from pain. On opening the body the kidneys were found to be completely dried up and reduced to two pellicles, which were filled with numberless small calculi and sand. The ureters resembled portions of the intestines, and were, as well as the bladder, filled with stony matter.

Des Champs states, having seen a patient who was cut six times for the stone. He mentions a monk, who died in 1789, with a calculus in his bladder, and who was lithotomised four times—from year to year. He also records the case of a cutler, who retained an incontinency of urine after having undergone lithotomy three times in twenty-one months.

In our own time, M. Souberbeille cut a septuagenarian three times in five years,—twice by the high, and once by the lateral operation.

Such tables of relapses as we have borrowed for our Appendix, besides leading those who venture to judge of operations, to be more charitable in their judgments, show the importance of subjecting patients, once operated upon, to an habitual prophylactic treatment and hygiene. There are three modes of treating such persons; removing inflammation of the urinary organs by bland diet, bleeding, cupping on the loins and leeching—by demulcent diuretics and chemical remedies;—by local resources, such as keeping the urethra of propre calibre: washing out the accumulations in the bladder with a demulcent fluid every other day, thrown in a full stream through large-eyed elastic gum catheters, etc. The observations made elsewhere on the alternating and capricious character of the secretion of stone, shows how little we are to depend on lithotriptics, beneficial as they are, whatever their chemical the resource left behind, Lithotripsy once done away with, instead of asking for absolute perfection. After the stone is crushed and supposed to be removed, you may again and again attentively examine the bladder, to see if there is any calculous particle left; you may examine in all directions, the bladder being distended by water, the instrument being free in the urethra. In Lithotomy you have but a moment to examine, the fluid that was in the bladder has of course escaped. The forceps moves not freely in the fresh wound, particles and scales of the stone are left behind, or even entire calculi and other bodies that may form nuclei of fresh formations; as in the case we have adverted to before, where the fifth time the patient, a surgeon, was operated upon, it was for a stone, of which the nucleus was a particle of sponge, left in the wound by accident in the previous operation. In other

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power — given in excess, they only change the character of the materials contained in the urine for forming stone. The alkalies are particularly to be distrusted, as they very frequently mask the symptoms of stone. Of this a memorable instance was given in the case of Mrs. Stephens' remedy, which deceived both physicians and parliament. It is in the great laboratory of the stomach that the healthful power is to be exerted, which counteracts the calculous diathesis;—it is in strengthening this organ, and the frame generally, that most can be done. The increase of stone in certain districts, since the genuine old beverage of pure beer has been abandoned, shews what the bitter, tonic and lulling effects of a medicament can accomplish.

cases of Lithotomy, some particles of stone may remain, detained by a fold of the membrane of the bladder. In a case rendered memorable by a trial, it was proved that an excellent surgeon had been detained near an hour before he could find the stone, hidden in a fold of the mucous membrane: had this circumstance not intervened to make it the longest operation perhaps on record, in such able hands it would have been performed, as it generally is, to a second by the watch, with the most marvellous rapidity. This proves the probability of leaving small stones behind in Lithotomy.

To show additional grounds for repudiating any but the most nicely balanced judgments on Lithotriptic instruments, and to inculcate at the same time practical knowledge, let us consider the powers and modes of *prehension* of the percuteur—the instrument we have singled out for our example, as being the simplest, and that which has eclipsed all the previous lithotrites.* The percuteur appears, out of the viscus, to take hold of the stone with the greatest ease; it does so with wonderful facility in it, but for a far different reason from that which its action out of the bladder leads one to suppose. Its mode of acting there must be known—facile as it may be even for an awkward person on many occasions to take hold of the stone whenever the instrument has reached the goal; first of all because this very facility is a source of danger to the parietes of the bladder, which by its contraction very often drives the stone into its clutches, and may be caught there with it, (a circumstance easily avoided or remedied, as we shall presently show,) and next because this ordinary facility of prehension does not diminish the duty and necessity of the surgeon's study of other dangers. Here, as elsewhere, the essence, origin, and importance of the medical man's office are found in difficulty. The surgeon might still be a barber, if cases of difficulty were not constantly arising to demand the strenuous

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* Nothing shows more triumphantly the superiority of this instrument than the recent works on Lithotripsy. Three large volumes have been just published in France; one by Dr. Civiale, another by Dr. Le Roy d'Etiole, and a third by M. Segalas. We have mentioned the reluctant admission of the first named able operator as to the value of the percuteur. Dr. Le Roy, who, as being himself the inventor of the first available lithotrite, has no interest to laud it, bestows on the percuteur the most unbounded praise. M. Segalas recommends it no less strenuously, although, in our opinion with an injudicious modification, and a convenient "muta-

to nomine." Vide Civiale, " Parallèles des divers moyens de traiter les Calculeux, Paris 1836.—De la Lithotripsie, par Le Roy d'Etiole, Paris 1836.—Segalas sur la Gravelle et sur la Pierre. Paris 1836. The two first authors, as being the principal operators on the continent, are the best authorities and the most competent judges to give an opinion, belonging as they do to the land where Lithotripsy was first invented, in a practical point of view. We need not say that the circumstance of Lithotripsy being so far a French invention, and all the good works on the subject being French, are the reasons why we have mostly quoted or referred to French authorities in the course of this sketch.

exertion of his mental faculties, and exalt the value of his office.

There are three principal modes in which the percuteur can be used for prehension, setting aside others less distinctly denoted by its inspection. The percuteur may be used sideways, in the position of the thumb and index finger, in taking sand from off a flat surface—or turned upwards as the same fingers in removing an apple from a tree—or directed downwards, imitating the movements of a bird's bill in picking up a pebble. Of these three manœuvres, the side movement has been deemed, by those who give opinions without weighing them, to be the most eligible proceeding and the easiest, the instrument sweeping over a larger surface. By those who have thought of the depression of the viscus behind the neck of the bladder, the third evolution has been deemed the best. But it is clear that acting in a hollow spherical body, the branches of the instrument cannot skim the surface as the fingers do the table, and that stopped by the curve of the viscus, the instrument will not probably grasp the calculus lodged below it in the arc of the circle its branches subtend, particularly when the stone is flat. When the calculus is very spherical, it will not be caught low enough, so that when it is grasped, the more powerfully it is squeezed, the farther off it may possibly fly ; just as we see a marble, by pressure of his fingers, projected from an urchin's hand. Besides, when acting sideways, the teeth of the instrument are nearer to the lining membrane of the bladder than in any other position.—In addition to this, the first evolution of the instrument, previously mentioned, may be impossible, if its beak is long, and the stone is in the hollow behind the neck of the bladder, where it generally lies. In this spot then, will another arguer say, I seek it with the open bill of the instrument searching downwards. But there you only grasp it with that part of the apices of the instrument where its power of prehension, in a properly constructed apparatus, does not reside; and if you attempt to seize the calculus with that part of the instrument armed with teeth, you may injure the coats of the organ, its folds, the septa, or circumvallations that surround the pits and cells so often found in a diseased bladder.

It need not be pointed out here, likewise, that in this position you seize the stone with the extremities, the weakest parts of the lithotrite—those which are farthest from the line in which the percussion is directly applied. The percuteur, one of whose most important features is *strength,* will probably resist all ill applied percussion, the most trying to its solidity; but, of course, no one should court a risk were it only one chance in the thousand against the operator and the person operated on.

Such are then the obstacles to these two evolutions, not barring their use, but rendering them the least eligible, and proving, once more, we repeat, how little the instrument in question is understood by those who are so liberal in opinions upon it.

There is the other position of the instrument which we have not discussed which is manifestly the best, if we duly weigh it: we of course allude to the use of the instrument to take hold of the calculus with its beak opened upwards. In this position the immoveable branch of the percussor, which exceeds the moveable one only by that portion of the extremity of its curve which is rounded, polished off, and toothless, pushes away as far as practicable the parietes of the bladder from being clutched between it and the shorter receding branch which is also innocuous at its apex. The instrument in this position lies open, vertically mostly, in a line with the raphe of the perineum, the stone must of course be on one side or the other, and pushed away by the instrument, it tends to re-enter its position in the centre line which its gravity makes it natural it should occupy: thus does it happen that impelled by this gravity, by the least motion, or by the contraction of the bladder, it comes nearly of itself into the clutch of the percuteur. The projection of the instrument above the surface does not oppose it, since it is reduced, by being opened, to one half its thickness—and also because it is depressed below the surface—being pushed downwards, by the operator were it only to form a hollow, into which the stone must fall of itself. But not only is the stone here more safely and easily caught, but it is caught in the strength of the weapon—as is said in the parlance of fencing—in that part which is thickest, nearest the hand, and in the direction of the mechanical power to be applied to crush it—therefore, also in the manner most likely to prevent the warping of the blades, should this be feared. But to this third mode of prehension there is one great objection—namely, that the instrument often strides forward over the stone, lodged probably in some pit, or in the cavity behind the neck. Hence the use of the admirable rectangular bed, which dropping the stone by its gravity out of this spot difficultly attainable, confers on its seizure a wonderful facility: in this respect, therefore, it is of the greatest importance, even were it not of such beneficial use for comminuting the calculus, without succussion of the patient, without pain, with security, and rapidity.

If the dropping the patient backwards does not effect the object—if some rare objection to this manœuvre—such as his being subject to apoplexy or asthma—prevents its being resorted to, then must be employed a different instrument—the short curved portion of which will allow of its entering into the cavity, instead of stretching over it. There may likewise be a reason here for using with caution the instrument with its beak downwards. Against having recourse to this manœuvre, on any occasion, we have no idea of directing our observations. But there is no more reason, because it is admissible on certain occasions, it should be used in all, than that the vectis should be used in every case of obstreticity, because in some few it is beneficial. One of the objections to its use on ordinary occasions we have said to be that, where it could seize the stone, it might seize the bladder. But let it not be thought that when the coat of the bladder lies betwixt the branches of the instrument, in dexterous hands, it will not be discovered—and will not be released without injury. Even with the beak upwards, the membrane may be thus taken hold of. The expression of greater sensibility of the patient, but particularly and long before any sensation is expressed, the touch conveys to the operator the contact of the lithotrite with the lining of the bladder—and a gentle inclination of the instrument sideways rids the latter of the membrane, leaving the stone in the lithotrite.

We need not repeat that the operator with delicacy may take hold of the coats of the bladder, without danger, for the purpose of exploration. But here again the importance of the instrument being well constructed, so that one branch may glide on the other at the least touch; for then they will recede from one another, when the operator ceases to press with his finger, on the resistance of any resilient surface. It is this faculty to recede, when necessary, which is one of the great properties of the percuteur —as when it recoils from the stone when the blow of the hammer has ceased, dropping the detritus.

Whilst the male, and female branch of a percuteur should move so lightly upon one another, it is highly important there should be no other freedom of play betwixt them, otherwise they will obscure those circumstances of which it is the office of the operator's touch constantly to keep a reckoning. Easy as it is to ascertain when the instrument touches a stone, whose contact is revealed even to the ear of attentive bystanders, we know that numbers of most lamentable mistakes have been made with the sound. If the branches of the lithotrite shake against one another, there can be little doubt that the same error may arise, although not with the same serious result. We cannot pass over the opportunity of remarking here what objections (were there no others), there are of the nature just stated, to the use of pressure screws or of any other appendage attached to lithotrites : they confuse the discernment of the operator and prevent delicacy of manœuvre as well as delicacy of touch. It would be easy to inspire fear in a person not conversant with surgery and acoustics, that the nature of the substance in contact with the instrument would not be discovered, at least early enough to prevent mischief; but generally the sensation and sound conveyed by a catheter when in the bladder, according as it touches a particle of stone or the mucous membrane, is known to the most juvenile tyro to be immediately perceived.

It will alarm and surprise those who are not conversant with Lithotripsy, to hear that the parietes of the viscus may thrust themselves betwixt the limbs of the percuteur in its most favourable position; since the bladder is always supposed to be distended by water when you operate, as far as it can comfortably bear. But there are cases where very little water is introduced; some where it is easier to operate with none conveyed in; some where the bladder will contract the more violently upon the instruments, in proportion to the quantity injected.* These are by no means always sources of extraordinary difficulty to the operator, or of pain to the patient.

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* The following practical observations on the resistance of the bladder to injection are highly interesting and useful to bear in mind:

"It appears extraordinary that the bladder, although distended with water, can, without any of this water escaping, contract to such a degree that the sound can only be moved to the extent of an inch, or an inch and a half, from the fore to the back part, and to about the same extent laterally. As water is incompressible, it must of necessity change its position during the contraction of the organ; and this is what in reality takes place. The fluid forced from the lower flows towards the upper part of the bladder, or as

The notions on the latter subject are as crude as those entertained as to some of the circumstances which prevent the employment of Lithotripsy. The propriety of resorting to this remedy does not depend for example, as generally thought, on the size of the stone, so much as on the space left round it. The stone may be very large, but if there be room enough for the percuteur to open, from the bladder not being hypertrophied and hardened, or from the irritability and contraction of the organ not being violent; under these circumstances, we say, the larger, generally softer in the external layers than the smaller calculi, are crushed with comparative ease and ultimate success—par-

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I commonly express it, *the lower part of the bladder, by its contraction injects the upper.* Indeed, if we compare the muscular power of all that portion of the bladder which would be situated above a horizontal line drawn from the neck and passing round the viscus to that which lies below this line, we shall readily conceive that when the organ contracts throughout its whole extent, one of these parts must yield to the other. In the upper part there is only the muscular coat, and even this is weaker at the apex than elsewhere, whilst in the lower portion there exists not only the muscular coat, which is itself very much developed, but also powerful auxiliaries. It is not therefore surprising that this weaker portion should yield to the stronger, and that pressing least upon the injected fluid, it should become distended, notwithstanding its contraction. From these considerations, therefore, we may come to the conclusion that *the bladder may receive a large quantity of fluid without being dilated at its lower part.*"—Vide Baron Heurteloup's Principles of Lithotripsy, chapter on the bladder as regards its connection with Lithotripsy, p. 85.—London, 1831.

ticularly since the new mode of removing the fragments, has surmounted the great difficulty that obstructed the progress of the art of cominuting calculus. There is so much in Lithotripsy which by habit and practice becomes intuition, and which cannot be conveyed, that it is difficult to establish more intimate principles, even when we have the most gifted and best informed operators to guide us—they cannot give an account of that which in them is an affair of tact and inspiration;—you must be present at the moment to see and catch the tenor and tendency of their manœuvres. But such principles as we have laid down, and many more our limits exclude, only require study, and observation of the form of the bladder and of the instrument, to be established in the student's mind.

It must strike the student, that amongst the advantages of Lithotripsy, in which security of patient and operator must of course always be the principal objects, not the least source of security is that the Lithotriptist suffices to himself. He requires no surgical assistance, as for Lithotomy; in which, unless the assistant follows, and guesses, in a great measure, the intentions of the surgeon, the most fatal disasters may occur. Of course we refer above to the mode of operating of Baron Heurteloup: several of the other processes having neither fixed point nor surgical bed. This surpassing advantage of the "omnia mecum" requires but the greater care on the part of the surgeon—who must become a student here, whatever his age and knowledge*—whose operation takes place out of sight of his advisers, as well as of himself, and whose tact and knowledge can nevertheless reduce the success of the operation to a certainty approaching to infallibility.

Far from the paramount object being merely or principally to break a calculus in the art of Lithotripsy, this is the least important point — it is only an indispensable, a first of many manœuvres, from which moment the real difficulties of the operator begin. The entire stone falls of itself nearly, in the embrace of so prehensile an instrument as the percuteur. How different the degree of difficulty, when fragments of all sizes and shapes irregularly broken, are hitching upon and lodging in every fold, lacuna or pit in the bladder—enveloped in viscous mucus, perhaps. It is here that the tact, knowledge, and acumen of the surgeon are displayed. It is here that he is to remember not to search for the fragments as in a receptacle of wood or porcelain, and not even to take hold of them, unless he can do so without irritating violently the bladder. The stone once reduced to fragments, that manœuvre which we have designated the most safe and advantageous in other respects, is often no longer possible: with the blades open upwards the percuteur can effect nothing in many cases: the hollow and declivity of the bladder being filled with detritus, the back of the instrument lies upon it, and it cannot be driven from that situation, without running the risk of excoriating the surface of the viscus. Here the importance of the invention of the spoon-billed instrument appears. The stone broken, the very large fragments which project above the surface, are comparatively easily taken hold of by the percuteur and broken, and then the spoon-billed instrument is immediately resorted to. The inner surface of its hollow extremities not being armed with teeth, skims the surface of the bladder, and seizes the fragments, without injuring the mucous membrane—a blow or two of the hammer given, the instrument is closed—breaking and moulding in its hollow a portion of calculous matter of considerable volume, which is brought away at once.

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* By referring in the Appendix No. II. to the letter of the celebrated German M. de Graefe, the reader will see the necessity felt by one of the greatest surgeons of Europe, of going to school once more.

The whole bent of a Lithotriptist's art and endeavours is to leave the patient, at whatever stage of the operation, in a state of ease and quiescence, which would not alter materially his chances, should the supervention of any malady in the unhealthy constitution of a calculous patient, so prone to receive the seeds of every disease, delay the continuous accomplishment of the extraction; or should any circumstance of more rare occurrence intervene to render the immediate or later extraction of the stone by Lithotomy desirable. It is in this combination of the two operations, at worst, that the great step has been made in the treatment of calculus. But unwise and untutored surgeons, who have practised Lithotripsy with their minds only possessed by the idea of clutching and breaking the stone, have been so careless of irritating the bladder, as to leave it in the most unfavourable state for this last resource of surgery. To this circumstance being added the outcry of the enemies of Lithotripsy, who, because a patient has submitted previously to this gentle process, have attributed to it the fatal results inherent to Lithotomy, (of which the chances are of course still the same after the lithotrite has broken the calculus,) a part of the professional public has been induced to believe that the previous use of Lithotripsy must of course render the other operation infinitely more fatal. It is needless to observe to those who read impartial reports on the subject, that Lithotripsy has been practised repeatedly with success under such circumstances. This fact is more remarkable, as it is not to be forgotten that the cases of which the Lithotriptic surgeon rejects the further treatment by his art, at any stage of the process, are almost always those which are most unfavourable, and present least chances of cure under either operation—Lithotomy being resorted to as overcoming all mechanical difficulties—not unravelling them—not untying the Gordian knot, but cutting through it: on the power of the *vis medicatrix* of the individual's constitution depending whether his thread of life will be once more firmly united. Should the percuteur even break—and when improperly constructed this appears to be the most probable accident, although it has not as yet to our knowledge, occurred here, and it is difficult to imagine it can, when it is tried with a heavier hammer previously—it will but be another fragment, which, if it cannot be removed with another percuteur, can be extracted with the calculous fragments by Lithotomy. The worst that could happen, therefore, to the patient (and we confess that this would be lamentable), would be to submit to the operation so lately the *sine qua non* of cure.* But the fact is, that in such a case, if the fragment of an instrument, or the nucleus of a stone should not admit of being drawn out through the whole course

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* We refer to the opinion registered below from Sir Charles Bell: as coming from an eminent Hospital Surgeon and profound physiologist, it must carry weight with it. This opinion, which implies there being comparatively little increase of danger in resorting to Lithotomy after the breaking of an instrument in the bladder, likewise must imply, there being as little peril independent of the danger attending at all times the operation itself, in having recourse to it during the treatment; when it is found more eligible from the peculiarities of the patient's situation. Lithotomy has often been resorted to, without bad results, to extract other broken

instruments from the bladder—a similar event to that which we have now in view:

"I value this instrument (the percuteur) on account of its form and strength. For, I repeat, I care not so much about breaking the instrument, as the fragment can be withdrawn with the stone by lithotomy: but bending the instrument is the most formidable thing, inasmuch as we can neither let it remain nor withdraw it without a rude and painful operation."—(*Extract from Sir C. Bell's Clinical Lecture on Lithotripsy. — Vide Medical Gazette.*)

The possible breakage of the percuteur in the bladder would not imply at all any violence having been done to the parts, the instrument when struck being usually in the middle of the injected water, far away from the parietes of the bladder. The nature of the power applied to fracture the stone is that which must produce far more readily a rupture of the instrument, than a warping, which more naturally arises from the continuous increasing power of the pressure screw. One case occurred some years back (which we have already adverted to), at the time the percuteur was just invented—indeed, if we mistake not, it was the second case in which it was employed. In one case we say, the instrument did warp; precautions were not then employed; and the exact character to be given by modification of form to the lithotrite were not then known. But here a fatal result did not ensue; the patient—an old gentleman—died when lithotomy had been performed with great success by one of the ablest surgeons of England; he died two months afterwards. We must remind beginners in Lithotripsy, that just as guns of the best construction of the channel of the urethra, it may in general be taken out at once by a " boutonnière,"—a small incision which may sometimes be made at one cut of the scalpel in the urethra, and which soon heals up. This slight incision is practised under other circumstances by surgeons of eminence; but the enemies of our new art have endeavoured to magnify it into something alarming.

The above expedient, we repeat, has been resorted to on other occasions;—as, for example, where a small stone has descended of itself, and got impacted in the urethra during the efforts of the patient to expel it. After Lithotripsy, when there have been so many fragments made, they may also descend; but the operator or his assistant are on their guard, and ready to resort to measures of immediate relief. The foreign body coming here into the urethra, is furnished with asperities, preventing any rapid advance, and which warn the patient and the surgeon, by the sensations in the former organ: generally a catheter

and well proved, may burst, not only by too enormous a charge, but by being used too long, so it is with Lithotriptic instruments, which must be adapted in strength to the size of the stone, and be equal to the force of the percussion, and not be used when they may be supposed worn out by time, if you wish to enjoy the security they offer. They should be tried with the hammer previous to every operation, and then examined with a magnifying-glass to detect if any fissure exist.

conveyed down to the stone, either pushes it back at once; or an injection of water, by first distending the channel of the urethra (distension by which alone the Arabs are said to extract small calculi) carries ultimately the stone in its flood, back into the bladder.

We have strayed in making these observations from the rule we wish to lay down to guide the lithotriptic operator. This is to act in such a way, as far as possible, as to leave the patient at any stage of the operation with respect to Lithotomy, in a situation not differing from that in which he would have been before—save and excepting the breaking of the stone. This, even before it is extracted, is likely to produce more dimunition than increase of distress, or of any of the other symptoms, attendant upon the presence of a foreign body in the bladder. It is this knowledge of the patient's state and of the limit of the capabilities of his art, that creates astonishment in the minds of the persons following the treatment of patients by an able Lithotriptist; when without any untoward event having occurred—he decides that such and such patient must be lithotomised. The appearance of a probability of the patient requiring an indefinite number of sittings; some uncommon peculiarity of constitution, of nervous system, or of conformation, make the operator prognosticate the possibility of his being obliged to give over altogether at some future period, and the patient being then compelled to have recourse to another means of relief, with a less chance of success. An inexperienced Lithotriptist goes on operating in such cases as those just alluded to—his mind possessed by the sole object of overcoming a mechanical difficulty; and as the stone goes on giving way, he persists without referring to the concomitant giving way of the patient's bladder, frame, and constitution from irritation. If during this pursuit of the stone at the expense of the sympathies of the frame, an operator of this order of merit be using the three branched litholabe—which nothing but the greatest expertness and attention can prevent pinching the nervous membrane—expanding before it is free from the embrace of the urethra and neck of the bladder—hitting the parietes of this viscus when the boring process is going on, &c. what mischief may occur need not be explained. By this needless martyrdom of the patient, by the most benign invention, Lithotripsy is disgraced; the operator becomes an enemy to the art, and if he be a man of reputation, well earned in other respects, his enmity will do an infinity of mischief. But who will tell an able surgeon of mature age, that he must go to school once more?

Amongst the objections and obstacles to resorting to Lithotripsy for relief, is the age of the patient—

very young children are the least calculated to bear this operation. Some of the reasons for this are equally applicable in certain grown persons—the smallness of the bladder and of the urethra, consequently the smallness, or slightness of the instrument to be employed, and the disproportion of the size of the stone to the organs through which it is to be extracted ;* together with the

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* We consider no apology necessary for introducing the following extract as bearing on this subject, besides the state of the case being so admirably exposed; we have used no ceremony in supporting our brief sketches of the different subjects throughout the volume with notes sometimes very long; they bear here the same relation to the description and narrative, which the deposition of witnesses does to the peroration of a barrister.

"If Lithotripsy has been invented for the purpose of avoiding the dangers of Lithotomy, its importance diminishes when considered with regard to children. For it is remarked that Lithotomy performed on children up to the age of seven or eight years proves much less frequently fatal than when performed upon the adult—and more especially upon old persons.

"This observation naturally leads us to feel less regret that Lithotripsy should not be so applicable in cases of children, as in those of persons more advanced in years. One of the principal causes of this is, that those who have the care of very young children seldom perceive the symptoms of stone at its commencement, or at all events, trace them to their right source.—A child states nothing, perceives nothing;—during the first two or three years, the calculus, having fallen into the bladder, continues to enlarge without any effectual remedial measures being adopted;—the sensations he feels he takes to be natural ones—and bears them for a long time:—till at last, the irritability, and mobility of the individual, &c.—Other palpable difficulties sometimes constituting insurmountable objections, are the lesions, cicatrices, and strictures in the urethra; such of those

instinctive movements, resulting from these painful feelings, increased to a considerable degree, denote a state of local suffering which can no longer escape the eye of an attentive mother. It is remarked that he has frequently his hand at the end of the penis—drawing it out to ease the painful sensation existing there: this he does to such a degree as to produce hypertrophy—his urine stops suddenly whilst he is voiding it; he stamps, his face, becomes red, he cries, screams, struggles, and convulsions very frequently supervene in very young subjects.

"But this unfortunately does not generally take place until the disease has become sufficiently serious for the symptoms to be thus strongly marked, and the calculus then must have attained the size of a filbert, or small walnut: (for calculi increase as rapidly in a child as in an adult). Under these circumstances, Lithotripsy would offer many disadvantages, first, because a stone which would be considered small for an adult, would be large for a child; secondly, because of the great difficulty of attacking the disease at its commencement; thirdly, from the small size of the urethra, fourthly and lastly, on account of the difficulty of keeping some children quiet.

"For we must remember that the question is not exactly whether Lithotripsy is *practicable*, in cases of children, but whether it offers *greater chance of success* than Lithotomy. This we doubt, when the stone has acquired the size of a filbert, before the age of three years, or of a small walnut before the age of six or seven years. These remarks of course become less applicable in proportion as the child grows older."

We have extracted these observations from Baron Heurteloup's *Principles of Lithotripsy*—p. 306. London.

diseases of the prostate as are deep and irremoveable; very large and hard stones contained in highly irritable and contracted bladders; hypertrophy to an excess, ulcers, tumours, fungous growths of large size; stones impacted in the bladder; those calculi which are pediculated or attached by small and rather long pedicles of flesh, can be removed, as we have an exaplme under our eyes at this time.

As additional, and sometimes insurmountable obstacles we may further add: a large scrotal hernia, by throwing the urethra on one side and impeding the manipulations necessary to the performance of the operation—excessive sensibility on the part of the patient, with a strong tendency to feverish excitement—a calculus imbedded in the urethra so as almost entirely to obstruct its channel, until the stone is removed, and the urethra restored to its calibre;—malformations of the bladder, as for example, when it is bilobed, sacculated, &c.

A great degree of organic disease, whether in the urinary apparatus, or in the vital organs, appears a sufficient reason to determine the impropriety of Lithotripsy, if the stone is sufficiently large to require several repetitions of the operation. Lithotomy is also attended with greatly increased risk, under these as well as under the other circumstances above named, and it remains in such cases to weigh well every circumstance—and adopt the method that appears the least dangerous.—These are some of the chief objections to the performance of Lithotripsy—offering obstacles either insurmountable, or more or less difficult to overcome, according to their complication, or the peculiarities attending them.

It would be vain to attempt to lay down rigid rules on this subject. When the ill state of the patient's bladder in appearance forbids the employment of Lithotripsy, frequently the first application of the instrument produces a favorable change; every fresh sitting diminishes the purulent nature and the fetidity of the mucous discharge and of the urine—the other symptoms of sympathy likewise giving way. We will make two more observations, to show how little founded are objections which appear at first of great magnitude.

So little appearance of blood is there in the course of the application of the Lithotriptic process, that an empiric who would wish to entice patients to his operating room, might proclaim that he professed the bloodless operation for the stone. But there are sometimes in the bladders of calculous patients, loose webs, or plexus of veinous vessels, particularly near the prostate; now it is very remarkable that this, which would appear an obstacle to Lithotripsy, is generally a circumstance of little importance. The varicose vessels squeezed by the instrument give the patient little sensation of pain, and the blood that comes away appears in many instances to relieve him. A few days back we saw a large quantity of blood come at the first sitting from an old farmer afflicted with a very large stone. He expressed no pain—answered he felt none, when questioned—and he *walked* away as he came, full of nothing but astonishment at what had been done "out of sight in his body." Again, one of the greatest and the most frequent obstacles encountered in Lithotripsy is the contraction of the bladder: now it happens, "as if for the sake of compensation, that this very contraction is often of service by bringing the stone or the fragments into the embrace of the Lithotrite,*" and facilitates the operation, when its violence is diminished by proper remedies.

These observations prove the difficulty of laying down rigid and well defined rules, or deciding "a priori" what case is fit or unfit for Lithotriptic manœuvres.

Unfavorable terminations of cases of Lithotripsy at its present advanced stage of improvement, arise, principally, we might almost say exclusively, from irritation of the parts, and of the frame through sympathy, in persons who have bad or irritable constitutions.* Therefore after you have ascertained that your patient has not such a habit of body, and particularly that he has no organic disease of the kidneys or prostrate, the question is first, how he bears the application of instruments, which should not give any material pain. The remainder depends on the operator's delicacy and adroitness in the use of the instrument, and his discernment as to how frequent, and how long are to be the sittings—how much stone he is to remove, how many times he is to use the Lithotrite, at each sitting, and what rest he is to allow his patient.

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* Vide Lithotripsie par le Dr. Le Roy d'Etiole p. 154.

Patients are submitted to a martyrdom, (as we have seen instances) to withdraw stones which exist only in the imagination of lithotriptic

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* On this subject, and on the value of Lithotripsy generally we refer to the following extract, as coming from the highest source; "It must be acknowledged that this operation possesses several advantages over lithotomy; it is less formidable to the patient: it requires little or no confinement, and many individuals will be induced to submit to it at an early period, who would not have mustered courage to submit to lithotomy, until after a lapse of time, when their sufferings had become excessive, and when probably, circumstances had arisen to render the operation dangerous. To this may be added that there is no danger of hemorrhage, nor of those ill consequences which arise from an incision, or from a laceration extending into the loose cellular structure which surrounds the neck of the bladder."

Sir Benjamin Brodie's Lectures on diseases of the urinary organs. 2nd. edition. p. 315. London.

Tyros; these supposed calculi are only a secretion of calculous particles produced by their own inexperience. Just as a blow or lesion of the kidney will produce gravel and renal calculi; irritation and inflammation of the bladder caused by instruments awkwardly handled and needlessly introduced, will occasion constant formation of the mixed phosphates accompanied by all the symptoms of stone. This will go on for months always increasing; whilst the patient submits from fear of Lithotomy, and the surgeon persists to torture him from ignorance of the new art, and of the pathology of the disease. As regards maladies of the urinary system, we know not of a morbid phenomenon more important to bear in mind, whether in the medical or the surgical treatment. We consider it will be most salutary in counteracting the chemical, as well as the mechanical treatments now so blindly resorted to on all occasions.

Most patients walk to and from the operator's residence: those who live in the country have come seventy or eighty miles or more, and return betwixt the sittings. Baron Heurteloup going to Paris to claim the prize from the Institute took with him a countryman from one of the distant provinces of England and operated on him before the commissioners on his arrival in Paris. It is needless to add that the operation succeeded, and the patient did well. But all these favorable circumstances are only to be found in operating on a proper subject — nor can one approve of the great latitude allowed to patients: in the hands of a beginner in Lithotripsy such liberty should not be granted. If the patient is healthy it is far different; as may be proved by the singular fact that men have been found in Paris to let themselves out at half a crown an hour for the use of Lithotriptists, who wished to make experiments with newly invented instruments.

The fact is, that the sensitiveness of the bladder, although considerable, like that of the eye has been greatly exaggerated. It were against reason, that nature should have invested, (in its normal state,) a vessel destined to contain so acrid and impure a secretion, with such habitual overwrought sensitiveness. But the bladder partakes of the peculiarities of other less sensitive parts of the body; like the bones and cartilages, when once diseased, its maladies are formidable, its recovery slow and difficult. Therefore must no case be undertaken by the Lithotriptist with any means but such as are rapidly effective as well as safe; and where the state of the organs will allow of proceeding in the application, with no other interruption of the plan of cure, but such as at all times is desirable to allow for the organ and the patient to rest. It is by the bladder being first irritated by injudicious and ignorant applications of Lithotriptic art and then left for a length of time full of fragments, that so gentle a remedy as that we advocate can be discredited. The duration of cure in Lithotripsy is, when judiciously managed, shorter than the recovery from Lithotomy, as proved by the table which we have annexed to this volume; independent of the absence, generally, of any pain betwixt the applications—the little experienced then, and there being no necessity of keeping the patient in bed, most patients not altering in any way their mode of life. The table referred to shows how illusory is the assertion that by Lithotomy patients are delivered of their stone at once. The argument of a patient is never that he would rather die than keep his complaint—at least such a feeling is only transient, and cannot influence his medical attendant. Suffering is the condition of man's life—he adheres to it, one would often think, the more strenuously the less its value becomes, and it is the melancholy duty of a medical man too often, by the resources of his art, only to prolong a most excruciating existence, where every breathing is torture. From whence arises, that delivering a patient of stone does not suffice, since he would consent to live on with a calculus, not only rather than encounter the throw of the dice when the chances are too much against him, but also rather than submit to the sufferings of a long recovery after the stone is gone, independently of the danger and consequences of mutilation.

Another point on which we wish to lay stress is the little preparation required for Lithotripsy—contrary to the opinions formed à priori by most surgeons. When the passage of mere bougies in stricture occasion so often shivering, sickness, ague, etc., we are at a loss to account for the little effect produced in most cases, by the apparatus of the Lithotriptist—of course we mean in competent hands. The difference in the degree of preparatory treatment, previous to Lithotomy and to Lithotripsy is to be accounted for, in great measure, by the absence of those dangerous mental revolutions which so often precede the former operation and leave the patient, when it is performed, in a state of collapse at the very moment he most requires the exertions of all the energies of his frame. The confidence which the patient feels in going to the Lithotriptist's house, that he is to return on foot or in a carriage as he came, is the preliminary cordial draught which an operation requires.

When the new art was first resorted to, much time was consumed in preparing the channel, by the dilatation of bougies, for the passage of the instruments of trituration. This is only resorted to now in cases that present great mechanical obstacles. Whilst the opening of the external orifice of the urethra, and the passage of catheters to ascertain its course, are found by experienced Lithotriptists generally to suffice; no operations are observed to proceed more unfavorably than those in which the patient's urinary organs have been repeatedly sounded or otherwise disturbed.

As to the constitution of the patient, it is seldom that any but the commonest restorative remedies are had recourse to. Whatever may have been the original disease, it is the mechanical irritation of the stone which now produces the disturbance of general functions, and often, some of the local symptoms, such as spasmodic stricture, etc. and thus wears down the constitution of the patient. During its presence all remedies generally fail in giving any durable relief; whilst as soon as the stone is broken down, either the dimunition of its volume, or the increase of hope and happiness, most often produce an improvement even before any large quantity of the calculous matter is removed.

During the progress of the cure, two sorts of medicines have been given with great disadvantage, although so often recommended. The first are opiates—the others purgatives; the first obscure the symptoms, whilst they constipate; and although useful in some cases, in others depress the energies of the patient. As to cathartics, we have good grounds to know they have produced over and over again the most disastrous effects, although persisted in with an obstinacy of routine, which sets all but that of habit at defiance. Laxatives and lavements alone should be given as long as they will produce the desired effect.

It is after cure from stone, that patients are most benefited by that medicine and hygiene which will prevent recurrence; and we must repeat, once more, that this treatment will be found really to consist more in the use of remedies that strengthen the stomach and frame, and thereby the bladder, than in those adopted only according to a chemical theory. Many a complaint will be cured by quinine and fresh air, which alkalies, acids and bougies have only rooted and perpetuated.

We can pursue the subject no further. We have endeavoured to compress into a small spacc, what several eminent Lithotriptists have divulged in ten times the number of volumes—each volume infinitely larger than the present, not only from our giving but an abstract of the subject, but also because every other author was engaged in the pursuit of his particular invention, and in wrangling with his rivals. Having paid the penalty of wading through all these documents, we have ventured to assume, in a certain degree, the office of judge, but we may naturally have had our judgment confused by the trial, and we are very desirous of referring the reader to the evidence. A great part of what we have brought forward, we owe to our own observation, and particularly to the study of men distinguished in the new art, who have not had any previous opportunity of publishing their lucubrations.

Even supposing that Lithotomy were the better remedy, patients will not henceforward have recourse to it, but where it is absolutely indispensable. Lithotripsy must, therefore, command the attention of surgeons the most adverse. But this, we are sure, is an argument we need not urge. They will feel, that if there is a sentiment which should be paramount to all others, where the interests of science are concerned, it is the firm opinion that the degree of improvement we have attained, however considerable it may appear, is only a state of transition to an epoch of still greater advancement. There is no study in which this opinion of the indefinite susceptibility of improvement in art, should be more resolutely upheld than in that of surgery.

As regards the general reader, who may be fortunate enough to have no friend or relative suffering from stone, we wish we had the power of describing all that persons from time to time endure, under the infliction of this terrible malady. One of the most atrocious of those tyrants who blacken the page of History, Tiberius, having tasked his invention to find greater tortures, had imitated artificially, and applied to his victims a torment, which is but one of the agonies of sufferers from the stone.* Of these sufferings Lithotripsy is the truly consolatory remedy. Deeply impressed with its benificence, and actuated as the British Parliament was a century since, the French government, amongst others, has assigned a Hospital for the practice, teaching, and improvement of Lithotripsy —encouraging the statistics of calculus, and disseminating generally the knowledge of the symptoms of its earliest and most remediable stage. This duty the members of the Lithotriptic Institution in this country have taken upon themselves with feelings above all praise.

However imperfectly the subject may have been developed by us, we feel confident that we have said more than sufficient to point out the paramount duty as regards lithotripsy—that of spreading its knowledge and its fame—of upholding it against its enemies—and of contributing to the support of a Charity destined to extend the blessing to society at large. The opulent classes on whom no experiment is ever tried, and whose great advantage is never to partake but of the mature fruit—these singularly privileged persons, we repeat, are immediately interested in such institutions, where alone lithotripsy can be duly studied and perfected.

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* "Excogitaverat autem inter genera cruciatus, etiam ut larga meri potione per fallaciam onoratos, repentè veretris delegatis, fidicularum simul urinæque tormento distenderit."—*Sueton: Liber. c.* 62. *c.*

Montaigne, who himself suffered from stone, says, in reference to this quotation:—" L'opiniastreté de mes pierres, specialement en la verge, m'a par fois iecté en longues suppressions d'urine, de trois, de quatre jours, et si avant en la mort, que c'eust esté folie d'esperer l'eviter, voyre desirer; veu les cruels efforts que cet estat apporte. Oh! que ce bon Empereur qui faisait lier la verge à ses criminels, pour les faire mourir, estait grand maître en la science de bourrillerie."

"Æquè pauperibus prodest, locupletibus æque;
Et, neglectos, æquè pueris, senibusque nocebit."—HORACE, EP. I. 1. 25.

STATISTICAL TABLES

&c. &c.

BEARING ON THE SUBJECT OF THIS VOLUME.

OPINIONS OF VARIOUS AUTHORS AND SURGEONS ON THE PROPORTION OF DEATHS AFTER THE OPERATION OF LITHOTOMY.

M. Lisfranc says in the discussion on Lithotomy and Lithotrity at the Academy of Medicine Paris, p. 31, that the mean proportion of death after lithotomy, in Paris is 1 in 4.

M. Velpeau, in the same discussion, observes, p. 128:—

"That in 5873 patients who were cut for the stone 5149 were cured and 724 died, or one in 7 and a fraction. In a *Traité* of Morand on Lithotomy, he gives a table of operations of lithotomy performed at *la Charité*, from 1720 to 1727 inclusive—the number of patients operated upon only amounts to 208, of which 71 died, making a proportion of one in 3. Morand gives another table of the practice at the *Hôtel Dieu*, during the same period. There is a total of 604 patients who underwent the operation, of which 184 died — making 1 in 3¼. If we unite these tables, there is an aggregate of 812 operations of Lithotomy, of which 255 proved fatal— or a proportion of 1 in 3⅙. Morand also gives the number of patients who were cut at *la Charité* from the year 1731 to 1735—they amount to 71, of which 32 died.

" Saucerotte at Luneville cured 1482 patients in 1629 operated on.

" From a table inserted in the *Dictionnaire de Médecine et de Chirurgie pratique; art. cystotomie, t.* VI *page* 54, we find that Dupuytren only lost 61 patients in 356. At the Norwich Hospital there is said to have been only 70 deaths in 510 operations; at Leeds 28 deaths in 197; Cheselden only lost 24 patients out of 213 that he cut; Frere Côme lost 19 in 100; M. Souberbiellé had 17 deaths in 133 operations; Dupuytren by the bilateral operation lost 6 patients in 70; in the table published by Mr. Cross (for which he obtained the Jacksonian prize), we find related in detail, 704 operations of lithotomy, of which only 93 were fatal.*

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† On the diseases of Calculus, by Crosse, London, 1835.

"M. de Rienzi has published the report of operations performed at Naples for the last few years:* only 60 patients died in 401 operated on. Pajola lost 5 in 50; Pansa 5 in 70; Ouvrard 3 in 60; M. Viriul 3 in 83: Martineau 2 in 84, and lastly, Mr. Dudley in America one only in 72."

M. Lisfranc in reply to M. Velpeau's statements of the proportion of death after Lithotomy says: †

"M. Velpeau observes that Sucerotte of Luneville only lost 147 patients in 1629 that he cut for the stone, or 1 in a little more than 11. We must in the first place deduct from this number 65 females, on whom Lithotomy is known to be much less dangerous—in point of fact, of these 65 two only died. We have then remaining 1564 male patients; but we must also bear in mind that Saucerotte hardly operated upon any but children; there were in the 1564 alluded to, 1119 under 13 years of age, and there were only 60 between the age of 41 and 78, at which age mortality is very much more frequent; Lithotomy has never been performed under more advantageous circumstances than his practice afforded.

"M. Velpeau alludes to results obtained in England, published by Messrs. Smith and Cross; they are less favorable than those of Saucerotte—but are still very admirable. I found in Mr.

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* Gaz. Médicale de Paris 1834, p. 79.

† Page 46, of the Rapport sur la Taille, &c.

Samuel Cooper's Surgical Dictionary, at the *Art. Urinary Calculi* results differing a little from those given by M. Velpeau

" At Bristol in 354 patients, 177 or the half were under 14 years of age; notwithstanding this favorable circumstance the general proportion of fatal cases is 1 in 4½, and in those who were more than 60 years of age, it would be one in 2, or 2½ at most.

" At Leeds the proportion is more favorable: in 197 patients, 28 only died, or one in 7, but of these, 101, or more than the half, were under 14 years of age.

" As regards the Norwich Hospital, the documents are much more accurate. Lithotomy was performed upon 506 patients, of whom 28 were women. We will leave on one side these 28 cases, of which only two proved fatal. We shall have left 478, in which there were 68 deaths—or 1 in 7. A splendid result. But in these 478 patients, 227 were under 14 years of age; and in very young children lithotomy is allowed to be generally preferable to lithotripsy. In these 227 cases of children, only 12 died—or 1 in 19; but in the 251 that remained, and which we will class as adults (although those who were from 15 to 20 years of age still offered very favourable chances), 56 died, or 1 in 4½.

Cheselden, it is said, only lost 24 patients in 213 that he cut for the stone. This requires to be proved; and so much the more, as Cheselden owns somewhere (Morand, *Opuscules de Chirurgie)*, that in 10 patients operated on by him, by the high operation, 4 died, and a fifth laboured under the most serious consequences, being reduced almost to a skeleton by his sufferings.

Frère Côme only lost 19 patients in 100—1 in 5. But it must be remembered that 59 out of the number were women, and must be subtracted, leaving 41 men—of whom 10 died, or 1 in 4."

According to Dr. Marcet, the mortality in the Norwich Hospital, during 40 years, was:

Before puberty -	1 in 18
After puberty -	1 in $4\frac{3}{4}$

COMPARATIVE TABLE

(FROM DR. CIVIALE) OF CURES AND DEATHS AFTER TRANSVERSE INCISION: IN BARON DUPUYTREN'S PRACTICE.[*]

Sex.	Time of Life.	Number of patients operated on	Number of Deaths.	Number of Cures.	Proportion of the number of deaths to the number operated.
Males	years from 1 to 10	19	1[†]	18	1 in 19
	10 20	5	1	4	1 5
	20 30	3	1[‡]	2	1 3
	30 40	2	1	1	1 2
	40 50	3	0	3	0 3
	50 60	2	1	1	1 2
	60 70	4	4[‖]	0	4 4
Females	from 10 to 20	1	0	1[§]	0 in 1
	30 40	1	0	1	0 1
	40 50	2	0	2	0 2
Total	from 1 to 70	42[¶]	9	33	9 in 42 or 1 in 4$\frac{2}{3}$[**]
Male persons .	from 1 to 70	38	9	33	1 in 4$\frac{1}{4}$
Female persons	from 10 to 50	4	0	4	0 in 4

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[*] The reader will find another report of Dupuytren's Operation by transverse incision included in another table, where the results differ from the above and are highly favorable.

[†] This patient aged 6 years died ten days after the operation, with symptoms of gastro-enteritis, as was proved by the post-mortem examination.

[‡] This patient 22 years of age, died with a large abscess on the nates.

[‖] Among these four cases there is one of an old man, 70 years of age. The operation offered nothing particular—but 9 days after its performance he died of hemorrhage, which came on several times, and could be not completely stopped by any hemostatic means known.

[§] A bi-lobed bladder.

[¶] It must be observed that in these 42 cases, there were 19 children under 10 years of age—and that in the remaining 23 (of which only 4 were above 70,) there were 8 deaths.

[**] In the above Table, and in several of those published by Dr. Civiale we have found manifest errors of computation, which possibly have escaped revisal in the great mass of figures brought forward, but although inadvertent they are highly unfavourable to the Lithotomists, rivals of the Lithotriptist just named.

COMPARATIVE TABLE

OF CURES AND DEATHS AFTER LITHOTOMY, DRAWN FROM THE PRACTICE OF SEVERAL SURGEONS IN PARIS.

Sex.	Time of Life.	Number of patients operated on	Number of Deaths.	Number of Cures.	Proportion between the number of deaths and the number operated.
	years.				
Males	from 1 to 10	37	2	35	1 in 18⅓
	10 20	17	1	16	1 17
	20 30	7	2	5	2 7
	30 40	7	2	5	1 1½*
	40 50	4	1	3	1 4
	50 60	5	4	1	4 5
	60 70	6	6	0	6 6
	70 80	2	1	1	1 2
Females	from 10 to 20	1	0	1	0 in 1
	30 40	1	0	1	0 1
	40 50	2	0	2	0 2
Total	from 1 to 80	89	19	69†	19 in 89 or 1 in 4⅔
Male persons .	from 1 to 80	85	19	65‡	19 in 85 or 1 in 4½
Female persons	from 10 to 50	4	0	4	0 in 4

N.B.—Death was occasioned in these 19 cases :

Once by a cancer in the bladder.

Once by the bladder being tri-lobed and retaining several calculi in one of its cavities.

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* Thus in the original; but should be 3½.

† Should be 70.

‡ Should be 66.

Once by a calculous affection of the prostate gland.
Once by difficulties resulting from the narrowness of the perineum.
Once by difficulties resulting from the excessive depth of the perineum.
Twice by difficulties resulting from the size of calculi.
Once on account of spasm and delirium.
Once by gastro-enteritis
Once by tearing the tissue of the prostate.
Twice by hemorrhage—making in all twelve.

In the other seven cases (that is to say only 7 in 89) the patients died of inflammation of the bladder, or of the cellular tissue occasioned by the operations, which were performed without the occurrence of any particular circumstance.

TABLE

SHEWING THE PROPORTION OF DEATHS AFTER THE OPERATION OF LITHOTOMY.*

	Number of operations.	Deaths.	Cures.	Imperfect cures.	Unknown result.	Without indication.
Cases published by Dr. Civiale.	3,985	638	2,862	97	44	344
From these we must deduct:						
1st.— patients operated by Lithotrity - - - -	245	5	237	3		
2ndly—patients operated by urethrotomy - - -	64	,,	60	,,	4	
3rdly—patients operated by simple dilatation without incision.	48	2	46	,,		
Total to be deducted - -	357	7	343	3	4	
Leaving - - - - -	3,628	631	2,519	94	40	
Operations performed at *La Charité* and the *Hôtel Dieu* from 1720 to 1727 - - -	812	2 5	557	,,		
Table of Norwich and Norfolk -	6 9	89	560	,,		
Bristol -	354	79	275	,,		
Total - - -	5,443	1,024	3,911	94	40	344

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* *Vide Dr. Civiale's work. Paris,* 1836. *p.* 349.

TABLE

OF DR. MARCET,

SHEWING A SUMMARY OF THE RETURNS OF CASES OF LITHOTOMY IN THE NORWICH AND NORFOLK HOSPITAL, FROM THE YEAR 1772 TO THE YEAR 1816.

	Number of Operations.			Deaths.		
	Children under the age of 14	Adults.	Total.	Children	Adults.	Total.
Males	227	251	478	12	56	68
Females	8	20	28	1	1	2
Totals	235	271	506	13	57	70

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* These important data will be found in Dr. Prout's *Inquiry into the treatment and nature of calculus*, p. 273. London. 1825.

TABLE

SHEWING THE PROPORTIONATE RESULTS OF LITHOTOMY ACCORDING TO THE METHOD EMPLOYED.

Methods.	Places where the operations were performed.	Number of patients operated.	Deaths.	Cures	Fistulæ.	Without indication.
1st. High Operation.	Lunéville..........	1103	119	984	7	0
	The Hospitals of Hôtel Dieu and La Charité Paris from 1720 to 1727 . . .	812	255	557	0	0
2ndly. Lateral Operation. Method of Cheselden	Lodi, Mantua, Bergamo, Brescia.. .	155	38	117	0	0
„ Frère Côme	Brescia, Cremona, Milan	113	14	99	0	0
„ Hawkins and Scarpa..	Milan..........	95	31	64	0	0
	Hospital of la Charité Paris..	61	30	20	0	10
	Lunéville..........	364	33	329	2	0
„ Lecat......	Udina..	49	4	42	3	0
„ Levacher ..	Milan..	50	17	33	0	0
	Venice............	63	19	44	0	0
„ Moreau.. ..	Milan, Pavia	39	6	33	0	0
„ Pajola	Prague..	22	4	18	0	0
Without indication of method resorted to.	Hospital of Beaujon	11	6	5	0	0
	Belluna	15	1	14	0	0
	Bergamo, Lodi .. .	114	26	88	0	0
	Dalmatia..........	38	6	29	0	0
	Lyons	43	10	33	0	0
	Maison de Santé, Paris	36	13	13	0	0
	Department of the					0
	Var............ ..	20	8	8	0	0
	Vienna........ ...	47	9	38	0	0
	Total....	1,335	275	1,027	9	10
3rdly. Recto-Vesical Lithotomy.	Bergama, Brescia, Milan..	74	14	57	0	3
	Lyons..	7	3	4	0	0
	Florence..	4	1	3	0	0
	Vacca's practice....	72	11	61	0	0
	Total....	157	29	125	0	3
4thly. The bi-lateral operation.	Hôtel Dieu Paris..	32	8	21	3	0
	According to former Table	89	19	69	0	1 in 4 ⅔
5thly. Taille Hypogastrique.	Paris	75	35	35	5	0
	According to the table published by Dr. Belmas	100	25	75	0	0

Dr. Civiale's last work, Paris 1836, page 350.

TABLE

DRAWN UP BY MR. SMITH OF BRISTOL.

There are 354 operations of Lithotomy performed in the Bristol Infirmary, and classed so as to show the proportion of deaths according to the different ages of the patients. This Table is taken from the Medico-Chirurgical Transactions for 1821.

Age.	Number of cases.	Deaths.	Cures.	Proportions.
From 1 to 10 years	135	29	106	1 in $4\frac{1}{2}$
„ 10 to 20 „	65	13	52	1 in 5
„ 20 to 30 „	35	5	30	1 in 7
„ 30 to 40 „	34	7	27	1 in 5
„ 40 to 50 „	37	11	26	1 in $3\frac{1}{3}$
„ 50 to 60 „	28	6	22	1 in $4\frac{2}{3}$
„ 60 to 70 „	18	7	11	1 in $2\frac{1}{2}$
„ 70 to 80 „	2	1	1	1 in 2
Totals	354	79	275	1 in $4\frac{3}{4}$

TABLE.

Mr. Smith also drew up the following table relative to the result in the Hospital at Leeds, in the space of fifty years. Out of 76,386 patients received, there were 197 labouring under calculus. This number is arranged so as to shew the frequency of the complaint at different periods.

Periods.	Number of cases.	Cures.	Deaths.	Age.	Proportion of Deaths.
				83 under 10 years of age	
From 1767 to 1777	24	16	2	21 from 10 to 20	1 in 12
„ 1777 to 1787	62	32	8	21 from 20 to 30	1 in 7¾
„ 1787 to 1797	23	8	3	12 from 30 to 40	1 in 7⅔
„ 1797 to 1807	42	19	7	28 from 40 to 50	1 in 6
„ 1807 to 1817	46	29	8	21 from 50 to 60	1 in 5¾
				9 from 60 to 70	
				2 from 70 to 80	
Total	197*	104	28		1 in 7⅓

* There are 65 patients who, it seems were not operated on—these, with the 104 cured and the 28 who died, complete the number admitted— 197. The number of operations performed, therefore, was 132.

The following table, taken from Dr. Prout's work, before referred to (page 274), presents a general view of the data furnished by the three foregoing tables, and shows, as far as they can be exhibited, the proportions of stone cases before and after puberty, and the relative frequency of the complaint in the different sexes.

Age.	Bristol.	Leeds.	Norwich.	Total.	Consisting of	
					Males.	Females.
14 years and under	178	96	235	509		
Above 14 years	177	101	271	549		
	355	197	506	1,058	1,014	44

We had intended to record the many cases of patients operated for stone by the knife without any being found. Our time and space have not allowed us to do so; but the following instance being derived from the practice of celebrated surgeons will suffice. Benjamin Bells states, that Cheselden performed lithotomy three times without finding any calculus in the bladder. Another remarkable case is related in the *Journal de Chirurgie*, of Desault. The justly celebrated surgeon, M. le Roux, relates four cases in his own practice, and very justly observes, that if every hospital surgeon was to avow those he has encountered, the amount would be appalling.

TABLE

DRAWN UP BY MR. CROSS, SHOWING THE MEAN DURATION OF THE TREATMENT BY LITHOTOMY.

Ages.	Number of			Mean number of days the treatment lasted for.	
	Patients operated	Cures.	Deaths.	Cases of cure.	Cases of deaths.
From 1 to 10 years	271	252	19	35	13
,, 10 to 20 ,,	99	91	8	60	16
,, 20 to 30 ,,	41	36	5	42	18
,, 30 to 40 ,,	43	40	3	56	10
,, 40 to 50 ,,	44	34	10	51	9
,, 50 to 60 ,,	94	70	24	54	20
,, 60 to 70 ,,	68	49	19	40	17
,, 70 to 80 ,,	9	6	3	65	5

Mean duration of the treatment in cases of cure —46 days.
,, ,, of death—15 days.

TABLE

SHEWING THE MEAN DURATION OF THE TREATMENT BY LITHOTRIPSY

Series.	Number of patients operated	Duration of the treatment — Days.	Results.		
			Cures.	Deaths.	
First	67	11	67	,,	
Second	54	26	54	,,	
Third	91	34	90	1	
Fourth	47	55	46	,,	1 incomplete cure.
Fifth	31	55	26	4	1 ditto.
Sixth	17	63	13	2	1 ditto. 1 result unknown.
Mean duration for every case—41 days.					

COMPARATIVE TABLE

OF THE RETURN OF CALCULUS AFTER LITHOTOMY, AND AFTER LITHOTRIPSY.

Modes of operating.	Number of patients operated.	Return of the complaint	Period.	Sequel and result of the treatment.
Lithotomy ..	88	9(*a*)	4—In the course of the first year after the operation.	2 patients were again cut: 1 [illegible]ed and 1 survived. The other 2 had recourse to Lithotripsy, and both were cured.
			2—During the second year.	2. Both had recourse to Lithotripsy and were cured.
			1—During the third year.	1. Also had recourse to Lithotripsy and was cured.
			2—During the fourth year.	2. Both died after Lithotomy which they underwent for the fourth time.
Lithotripsy*	244	11(*b*)	3—In the first year after the performance of the operation.	3. Had recourse to Lithotripsy for the second time and all were cured.
			3—During the second year.	3. Had again recourse to Lithotripsy—1 was radically cured—the other 2 continued to form gravel, which it was necessary to extract, owing to paralysis of the bladder.
			4—During the fourth year.	3 of the 4 were operated a second time by Lithotripsy and were cured—the fourth died without undergoing any operation.
			1—During the sixth year.	1. Also had recourse to Lithotripsy, and was cured.

(*a*) One of these patients, although young, has had a recurrence of the stone eight times;—6 times it was removed by Lithotomy—and twice by Lithotripsy. Another had three attacks in less than two years; he was twice cut, and last of all underwent Lithotripsy; since which, he has remained well for four years. Two of the patients who submitted to Lithotomy, had the operation repeated at short intervals. Three other patients had been cut for the first time, when very young.

(*b*) The fourteenth case is very remarkable—one year after Lithotripsy was performed, the stone returned: Lithotomy was had recourse to. One year afterwards, this latter operation was repeated. About three years later, there were remnants in the bladder for the fourth time, and the patient chose Lithotripsy. This is M. Oudet's case of which I gave a report in the transactions of the Académie de Médecine.— (*Vide Dr. Civiale's Parallèle des divers moyens de traiter les calculeux— Paris* 1836.

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* We have annexed reports on Lithotripsy—although from their limited nature they are insufficient. We cannot imagine how they can be so favorable, dating as they do from the origin of the art and including the use of the most imperfect instruments. The demand for statistics of Lithotripsy at the present state of its progress is premature.

The following accounts are derived from the last work of Dr. Leroy. They represent the practice of Dr. Civiale with the three-branched instrument in a very unfavourable point of view, and form a counter-statement to that on the preceding page. The reader will have to arbitrate betwixt these contradictory reports of rival practitioners.

Reports of Messrs Larrey and Double of operations performed by Dr. Civiale at the Hospital Necker, in the years 1829, 30, 31 *and* 32.

REPORTS FOR THE YEARS 1829 AND 1830.

Number of patients admitted to the Hospital	24
Number of patients operated by Lithotrity	18
Number of patients cured	13
,, who died in consequence of the operation	5
,, who were cut, and died	6
Making in all the original number	24

REPORTS OF M. DOUBLE FOR THE YEARS 1831 AND 1832.

Number of patients admitted into the Hospital	53
Number of patients chosen for the performance of Lithotrity.	43
Number of patients cured	27
„ not cured . . .	6
„ who died . . .	10
Making in all the original number	43*

**Vide Dr. Le Roy sur la Lithotripsie. Paris,* 1836. *p.* 156.

TABLE*

OF TWELVE CASES IN WHICH LITHOTOMY WAS PERFORMED A SECOND TIME ON MALE PATIENTS.†

Numbers.	Age at first operation.	Interval between the first and second operation	Weight of the Calculi.		Observations.
			1st. Operation.	2nd Operation.	
1	15	months 16	ʒ ij	ʒ iij	Three calculi were removed at the first operation, broken into many fragments
2	48	12	ʒ iij	ʒ v	One flat lithic acid calculus first removed entire. The calculus removed by the second operation is of the same composition.
3	63	32	ʒ jv	ʒ iij	One flat lithic acid calculus at first operation, unbroken.
4	26	12	—	ʒ jv	Weight of the first stone unknown. Both rectal and perineal fistulæ from the first operation, which were cured by the second.
5	8	17	ʒ ij ℈ j	ʒ jv ss	One entire calculus at first operation, which left a recto-urethral fistula.
6	3½	24	ʒ ij ss	ʒ ij ℈ ij	The first calculus removed entire.
7	2½	15	℈ ij ss	ʒ j	The first calculus alkaline and broken into many fragments in the extraction
8	3	14	℈ j	ʒ ij ss	Two small calculi of oxalate of lime removed by the first operation.
9	65	130	℥ j ss	℥ ij	First stone entire;—the second was an oval stone, composed principally of lithic acid.
10	18	8	ʒ vj	ʒ jv ss	The first stone was entire, with an alkaline exterior.
11	46	12	ʒ x ss	ʒ j ℈ j	The rectum wounded in the first operation—and a recto-urethral fistula existing when the second was performed.
12	7	24	ʒ j ss	℈ ij	The first operation was perfect, and a firm entire globular calculus removed

* Cross, Treatise on the formation, constituents and extraction of the urinary calculus—Vide Appendix, p. 164.

† Two of these patients: numbers 9, 11 died after the second operation. The others recovered—Number 3 had a third recurrence of the complaint;—but it was considered advisable not to operate upon him.

APPENDIX No. I.

EXTRACTS FROM CONTEMPORARY RECORDS RELATING TO MRS. STEPHEN'S STONE SOLVENT, FOR WHICH PARLIAMENT AWARDED £5000 IN 1739.

We have annexed the following extracts, in the persuasion that they will fulfil other objects, besides the gratification of curiosity: they prove the opinion always entertained of the grievous nature of calculous disease, the duty the Legislature of a past age felt, of endeavouring to alleviate it, and its philanthropic efforts to discover, and to reward, those who would furnish a remedy. These documents, are no less illustrative of the illusions of mankind on the subject of medical treatment. They are an example of the many triumphs of quackery, folly, and deception, backed by temporary success, and apparently supported by irrefragable evidence. They show how they can be countenanced not only by the public, (who can never judge of medicine but by appearances,) but also by such medical men as are either imaginative enthusiasts, or more designing characters. In the former point of view, we have naturally felt desirous to stimulate the zeal of our own epoch, by an example taken from the "Good old times of England." We leave it to the good sense of the public, to apply what they see on the "reverse of the medal," to the prevalent folly of the day.

THE GENTLEMAN'S MAGAZINE VOL. VIII 1738, P. 218.

Mrs. Stephens has proposed to make known her medicines for the stone public, in consideration of the sum of £5000, to be raised by contribution and lodged with Mr. Drummond, Banker. He has received since the 11th of this month, about £500 on that account.

JOURNALS OF THE HOUSE OF COMMONS,
VOL. XXIII. P. 302, A.D. 1739.

A petition of Joanna Stephens was presented to the House and read, setting forth that the petitioner has for some years past been possessed of a method of preparing medicines which are found, by experience, to be a safe and effectual cure for the stone—and by which she has her present subsistence; and that several persons of distinction, to whom these cures performed by the medicines have been made known, have endeavoured to raise the sum of £5000 by voluntary contributions, in order to purchase of her the method of preparing and giving the said medicines, and have accordingly raised the sum of £1387. 13*s*. for that purpose, but see no probability of completing the sum of £5000: and, therefore, praying the House to take the premises into consideration.

The Chancellor of the Exchequer, by His Majesty's command, acquainted the House that His Majesty, being informed of the contents of the said petition, recommended it to their consideration.

A motion was made, and the question being put: that the said petition be referred to the consideration of the committee of the whole House, to whom it is referred to consider further of the supply granted to His Majesty.

The House divided.

The yeas went forth.

Tellers for the yeas	The Lord Cornbury Mr. Thos. Townsend	105.
Tellers for the noes	The Lord Sundon Mr. Earle	62.

So it was resolved in the affirmative.

12TH YEAR OF GEORGE II. A.D. 1739, CHAP. XXIII. P. 394. STATUTES AT LARGE 6TH VOL. I.

An Act for providing a reward to Joanna Stephens, upon a proper discovery to be made by her for the use of the public of the medicines prepared by her for the cure of the stone.

" Whereas Joanna Stephens, of the City of " Westminster, spinster, hath acquired the knowledge of medicines, and the skill of preparing " them, which by a dissolving power seem capable " of removing the cause of the distemper of the " stone, and may be improved, and more successfully applied, when the same shall be discovered " to persons learned in the science of physick. " Now for encouraging the said Joanna Stephens " to make the discovery thereof, and for providing " her a recompense in case the said medicines shall " be submitted to the examination of proper judges, " and by them be found worthy of the reward hereby " provided ; may it please your Majesty that it may " be enacted, etc." " £5000 granted out of the supplies for the discovery of Mrs. Stephen's medicines. Treasury to issue the said sum on a " proper certificate."

EXTRACT FROM THE DAILY ADVERTISER, MARCH 28TH, 1740.

At a meeting of the trustees appointed by an Act of Parliament, to examine Mrs. Stephens' medicines, on Wednesday, March 5, 1739—40, in the Princes Chambers, adjoining to the House of Lords, four persons appeared before them on whom these medicines had been tried.

After these persons, and other evidence had been produced, the certificate which was required by the Act of Parliament was signed by all the trustees that were present at the meeting, except Dr. Pellet and Dr. Nesbit, who having some doubts with respect to the words *dissolving power*, gave separate certificates.

CERTIFICATE REQUIRED BY PARLIAMENT.

We whose names are under-written being the major part of the trustees appointed by an Act of Parliament entitled, an Act, &c.— do certify, that the said Joanna Stephens did, with all convenient speed, after the passing of the said Act, make a discovery to our satisfaction, for the use of the public, of the said medicines, and of her method of preparing the same—and that we have examined the said medicines and are convinced by experiment of the utility, efficacy, and dissolving power thereof.

SAME VOLUME, P. 298.

A full discovery of the medicines given by me Joanna Stephens for the cure of the stone and gravel; and a particular account of my method of preparing and giving the same.

My medicines are a powder, a decoction and pills.

The powder consists of egg-shells and snails both calcined.

The decoction is made by boiling some herbs (together with a ball consisting of soap, swines-cresses burnt to a blackness, and honey) in water.

The pills consist of snails calcined, wild carrot-seeds, burdock seeds, ashen-keys, hips and hawes, all burnt to a blackness, soap and honey.

The method of giving these medicines is as follows:

When there is a stone in the bladder or kidneys, the powder is to be taken three times a day: viz. in the morning after breakfast—in the afternoon at five or six, and going to bed. The dose is a dram avoirdupois or 56 grains, which is to be mixed in a large tea-cup full of white wine, cyder, or small punch—and half a pint of the decoction is to be drank either cold or milk-warm after every dose.

During the use of these medicines the patient ought to abstain from salt meats, red wines and milk; drink few liquids and use little exercise; that so the wine may be more strongly impregnated with the medicines and the longer retained in the bladder.

Instead of the herbs and roots above-mentioned, I have sometimes used others, as melons, marsh mallow, yarrow red and white, dandelion, water-cresses, and horse radish root, but do not know of any material difference.

This is the manner of giving the powder and decoction. As to the pills, their chief use is in fits of the gravel attended with pain in the back and vomiting, and in suppression of urine from a stoppage in the ureters. In these cases the person is to take five pills every hour, day and night, when awake, till the complaint be removed. They will also prevent the formation of gravel, and gravel stones in constitutions subject to breed them, if ten or fifteen be taken every day.

J. STEPHENS.

June 16th, 1739.

TO THE AUTHOR OF THE DAILY POST, AUGUST 9, 1739.

Sir,

As we are so happy, by the generosity of a British Parliament, to be provided with a remedy against the dreadful symptoms and dire effects of the stone and gravel, a gentleman has been so kind, for the ease of private families, to draw out a catalogue of the materials necessary to be provided and kept in readiness, for the more convenient and speedy preparing Mrs. Stephens' medicines, &c.

Alicant soap, ashen keys, burdock leaves, ditto root, ditto seeds, camomile flowers, ditto herb, wild carrot seed, swines cresses, water cresses, dandylion, egg shells calcined, sweet fennel, ditto roots, hawes, hips, mallows, marsh-mallows, parsley, ditto roots, horse-raddish roots, snails calcined, yarrow red, ditto white.

Utensils.—Bottles and corks, boxes, crucibles, furnaces, mortar and pestle, sieves, paper, pots, phials, weights and scales, &c.

GENTLEMAN'S MAGAZINE AND HISTORICAL CHRONICLE, VOL. IX. P. 159.

" Was shewn before the Royal Society a stone taken out of the bladder of Mr. Underwood, keeper of the White Lion Tavern, Whitechapel. It appeared very much wasted, the shell mostly destroyed, and much of the internal substance eaten into, so as in some measure to resemble a carious bone. He had taken Mrs. Stephen's medicines for six months, and had left them off three, when a looseness coming upon a fit of the stone, carried him off. Mrs. Stephen's medicine will be purchased by parliament."

Forty-one cases submitted to Mrs. Stephens' medicines divided into four classes, p. 69.

1st. Class. An account of twenty-two persons who were sounded, and stone detected, and who were submitted to Mrs. Stephens' medicines.

These persons were all sounded and found to have stone; twelve were sounded by myself, and the rest by surgeons of character: their ages varied from three to seventy-nine.

Two of these patients having but lately began to take these medicines, we may reduce the number to twenty who have finished the course.

Of this number there are four who took the medicines but a very little while; one found himself considerably relieved, two received neither benefit nor hurt, and the fourth upon suffering great pain from the stone was cut, and a soft stone extracted from him.

Of the sixteen who took the medicines a considerable time there were eleven grown persons, and five children: three of the grown persons received no benefit—four were greatly relieved: and four judged themselves perfectly cured.

Only one of the five children said he was relieved; the four others said they were not relieved at all, and had the operation performed on them; the stones were retracted shewing no signs of dissolution.

2nd Class. "It consists of five persons who took the medicines for diseases of the kidneys and bladder, different from the stone. Such of those as complained of nephritic pains appeared to receive benefit; but the medicines increased the disorders of those who made purulent urine.

3rd. Class. "Consists of eight persons of either sex who took the medicines for the gravel; two whereof reckoned themselves perfectly cured; four more were relieved, and two received no benefit, but several of them brought away stones, even of considerable size.

4th Class consists of six patients who had symptoms of stone but were not sounded. One of these who was nearly sixty years old, took the powder and the decoction for nearly three months and then perceived nothing of the disorder. Four others were relieved, bringing away entire stones—and the other two, pieces of stone in the form of scales.—*M. Morand's Account transcribed from Mr. Gem.*

It would be needless to make any further remarks upon the above observation of that ingenious surgeon, than to take notice that of those forty-one persons who underwent the course of Mrs. Stephens' remedies, it appears by the account which we may be confident is impartial, that there is not a positive instance of a perfect cure. That the children could receive no relief at all. That the medicines increased the disorders of such as had ulcers in the kidneys or bladder. That even of those said only to have gravelly complaints, but two *thought* themselves cured. That only one who had symptoms of stone, but unsearched, *thought* he was cured; and that of twenty-two who were searched and stones found, only four *judged* themselves perfectly cured."—*Parsons, on the Bladder*, 1774.

The celebrated Dr. Hartley was a great supporter of Mrs. Stephens, and underwent himself a long treatment. On this subject we find an address to the Faculty of Physic, in p. 8. by a gentleman in answer to a letter Dr. Hartly inserted in the Daily Advertiser, 22nd August, 1739.

That gentleman was a constant partisan of the doctoress; he was fully convinced of the advantages he received by undergoing her course of treatment during his life-time, and recommended, with his last breath, the search of his body, to convince the world of the success of the same, when two very large stones were found, as the public papers bear record.

SAME AUTHORITY, P. 113.

"All the experiments that have been made, from time to time, with regard to Mrs. Stephens' medicines, can amount to no more than to show, that soap is an aperitive and scourer of the parts through which it passes; but before we were better informed, by the only experiment, opening bodies after death, they indeed tended greatly to encourage mankind to an implicit belief of their being able to dissolve the stone in the kidneys and bladder."

He then goes on to say, that the long continued use of these medicines in large quantities is injurious, not only to the body, but brings various authorities and experiments to prove, that the calcarious matter, voided by patients during the use of Mrs. Stephens' medicines, is the calx of these medicines; he also adds, that if this calx is not voided, it will concrete in the bladder, each particle being a principle sufficient to receive the addition of fresh ones.

He then quotes the opinion of Venette as follows:

"The same may be said of egg-shells, which are truly stones, and are formed of like principles, and carry with them the characters of petrifaction. What good then can be expected of any stones for destroying those that are bred in our bodies? Certainly these matters have not been well examined, and often remedies are blindly confided in which, instead of having any efficacious virtues, are not only useless but of very dangerous consequences."

APPENDIX No. II.

DOCUMENTS RELATIVE TO TWO CASES OF PATIENTS WHO, HAVING BEEN OPERATED UPON BY LITHOTRIPSY (BY PERCUSSION) DIED SOME YEARS AFTERWARDS OF OTHER DISEASES, AND WERE EXAMINED AFTER DEATH.

FIRST CASE.

*Document signed by the Medical Officers of the Royal Greenwich Hospital, relative to a Public Operation performed there.**

These are to certify, that Samuel Gudge, upon whom Baron Heurteloup successfully performed Lithotripsy, in the Royal Hospital, at Greenwich, in the year 1830, enjoyed good health from that time up to the latter end of the year 1832, when he was attacked with Phthisis pulmonalis, of which disease he died on the 3rd April, 1833.

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* This case offered many difficulties, owing to the large size and excessive hardness of the calculus. But all these yielded to Lithotripsy, and the result was no less successful and satisfactory, than it was important as proving the efficacy of the operation.

On the examination of the body after death, there was not a particle of stone in the bladder, nor did that viscus exhibit the least appearance of disease, except that its coats were slightly thickened.

Given under our hands at the above Hospital this twenty-fourth day of February, 1834.

(Signed) Wm. BEATTY, M.D.

Physician of Greenwich Hospital.

R. DOBSON. M.D.

Surgeon of Greenwich Hospital.

SECOND CASE.

Letter addressed to Baron Heurteloup by Dr. Finlay, aud sent at the same time with that of Dr. Buchanan, which follows.

Ellis's Hotel, St. James's Street,
May 11, 1836.

Sir,

I consider it a duty to send you a letter which I have just received from Glasgow, where Mr. Finlay, my relation, whom you probably recollect, has just died.

The testimony which you will find there, of the perfect success of the operation which you so ably performed a few years ago, can but be gratifying to you.

I remain, &c.,

M. Finlay.

*Letter addressed by Mr. Buchanan, (the Medical Attendant of a deceased gentleman operated upon by Lithotripsy,) to Dr. Finlay, his relative.**

Glasgow, 7th May, 1836.

My Dear Sir,

Mr. Hamilton told me, that upon examining Mr. Finlay after death, the bladder was found in a perfectly sound state: and, excepting the enlargement of the prostate gland, (a common occurrence in old persons) there was nothing whatever wrong in that part. The Baron's operation had been most completely successful, there not being the vestige of a stone left. The heart was not in a sound state, and the immediate cause of death, as I told you, was the bursting of the blood-vessel arising out of it; the space within the pericardium was quite filled with coagulated blood.

I remain,
My dear Sir, &c.,
James Buchanan.

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* This patient, when operated upon, was nearly eighty years of age, and had, for many years, been labouring under the complaint, of which Lithotripsy by percussion so completely cured him.

DOCUMENTS RELATING TO THE INVENTION OF THE CURVED SCREW LITHOTRITE.

Letter of J Hodgson, Esq., Surgeon to the Birmingham Hospital, &c., &c., &c.

Birmingham, April 27, 1836.

My dear Sir,

In the year 1825, Mr. Salt, the surgeon's instrument maker in this town, shewed me an instrument which he had made for Dr. Haygarth, for the purpose of extracting small calculi from the bladder. This instrument consisted of a split sound, the inner blade of which was moved upon the outer by means of a finger loop attached to the straight extremity of the former. It occurred to me, that if a screw were attached to this instrument, it might be employed for the purpose of breaking stones in the human bladder; and under my direction, Mr. Salt constructed the instrument of which I send you an outline representation, which will explain its form and action better than I can do by words. (See plate after next letter.) In 1832, Mr. Salt made for me a second instrument, of larger dimensions, but upon the same construction, and for the same purposes. This instrument I shewed to Sir Astley Cooper, and several other friends in London, in May, 1833. You ask me to send you any documents which will put you in possession of the date when my curved instrument was first constructed for pulverising calculi in the bladder. I can procure no better document than a reference to Mr. Salt's ledger, in which this instrument is charged to me on the 15th August, 1825, and I send you a letter from Mr. Salt in which he states this fact, as well as the circumstances which led to the construction of the instruments. He has also sent me that portion of the ledger in which the instrument is charged to me, If you wish it — this I will send for your inspection, as well as the instrument itself. I may likewise add, that in 1825, I tried this instrument upon a patient in the Birmingham Hospital, in the presence of Mr. Partridge, the Junior Professor of Anatomy in King's College, London, and it was, at that time, seen by many members of the Profession.

Believe me, &c.,

J. Hodgson.

The following is a letter addressed by Mr. Salt, the Instrument Maker, to Mr. J. Hodgson.

5, Dale End, Birmingham

Sir,

I have referred to your account in my ledger, and I find on the 15th August, 1825, an instrument for breaking stones in the bladder charged to you. A short time prior to that date, I made an instrument for Dr. Haygarth to extract small calculi by way of the urethra, which instrument you saw, and suggested that if a screw was attached to a similar instrument, you had no doubt that stones in the bladder might be broken by screw pressure. In consequence of your idea, and according to your directions, I made the following instruments.

I am, Sir, &c., &c.,

T. P. SALT.

Surgeons' Instrument Maker.

Instrument of Dr. Haygarth altered by Mr. Hodgson and adapted to breaking Stones in the Bladder.

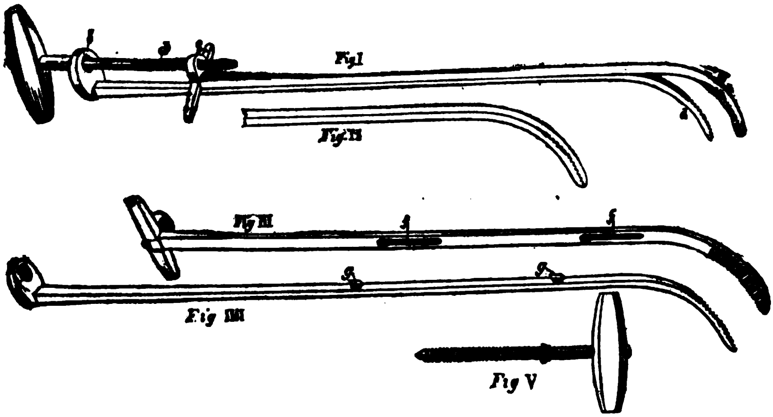

Fig. 1. The entire instrument with the blades opened. *a*, the screw, which, by passing through the loops *b* and *c*, forces the inner blade *d* upon the outer blade *e* and thus closes the instrument.

Fig. 2. The extremity of the instrument with the blades closed.

Fig. 3. The outer blade of the instrument. *f f*, the two groves into which the projecting points from the inner blade enter.

Fig. 4. The inner blade. *g g*, the two projecting points from the convex surface of the inner blade, which pass into the corresponding grooves of the concave surface of the outer blade (*Fig.* 3, *f f.*) and thus retain the blades together.

Fig. 5. The screw.

Since writing the preceding description, an instrument has been shown to us, which resembles that figured on the preceding page, and which is of a date anterior by many years, and which was intended for the comminution of calculi. It is an exact imitation of a stone crusher placed twenty years ago, in the hands of A. White, Esq. Surgeon to the Westminster Hospital, and late President of the College of Surgeons—it was made by Stodart. The merit of the distinguished Surgeon, whose name we have previously mentioned in the letter annexed, was to have *applied* the instrument to the pulverization of the stone in the bladder. Thus was one step more made towards establishing the new system of treatment at the present day so successful. On finding the difficulties and danger attending the use of the instrument in the form delineated on the preceding page, it was set aside, and the new discovery was once more at a stand. It was reserved for Baron Heurteloup by his extraordinary mechanical ingenuity, his continuous and exclusive attention to the subject—by the "ensemble" of the apparatus he invented—to bring to completion a discovery of which other surgeons, distracted by so many other objects, had only furnished the primordial elements. Those who would have that this invention existed in a state of susceptibility of practical application previously, are casting an unjust reproach on the great body of Surgeons: they thereby imply that the neglect of the invention was due to their want of perspicuity. Had the instruments existed in an available form, they would have been, we are sure, immediately employed in practice.

Extract of a Letter addressed by Dr. Graefe of Berlin, to Dr. Le Roy d'Etiolles, proving his opinion of Lithotripsy, and of the necessity of the most experienced Surgeons studying it practically—together with a case illustrating the success of the new art.*

My gratitude is due to you, my illustrious colleague, for the instructions you were good enough to give me, when I was last in Paris, relative to the operation of Lithotripsy by percussion—the important invention of which, belongs to the rare merit of Baron Heurteloup. You allowed me to be present at several of your operations, which were performed with so much care and skill that, from that moment, I became one of your most zealous admirers.

Allow me to say, Sir, that your clear demonstration, and the accuracy of your instructions as regards the handling of the instruments, were of much greater service to me than all I had read on the subject—and that they alone made me competent to transplant Lithotripsy by percussion, into my country.

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* Vide Dr. Le Roy's work, *De la Lithotripsie*, p. 166—Paris, 1836

I think it my duty to relate to you my first operation.

The patient was one of the Intendants of the Prussian Army, M. Maass, sixty-five years of age. His constitution had become much impaired by excessive suffering, and the water deposited a large quantity of puriform matter indicating an advanced state of disease of the bladder. With the catheter I detected a calculus which appeared to me of middling size; and I resolved to operate with the *percuteur*. The operation was performed in the Lecturing Room of the Clinical Institute, on the 26th June, 1834. The stone was readily seized by the *percuteur courbe*, and was an inch and a half in diameter; the hammer indicated the hardness of the exterior of the calculus, but the ready manner in which it afterwards yielded to the blows, pointed out that the interior was of a softer substance. The patient, although very sensitive, felt no farther inconvenience during the operation than what usually attends simple sounding; the instrument was then withdrawn, and considerable portions of stone were voided at the time, and during several days. The second operation was equally successful. The continuance of the treatment was here interfered with, by my being obliged to accompany H.R.H. Prince George of Cumberland, to the Springs of Pyrmont. On my return, I resumed the treatment. I am now at the fifth operation. A large quantity of stone has been voided; the constant and severe pain, before experienced, has now subsided—the irritation and puriform secretion from the bladder, as also the attacks of fever, have also entirely ceased—the patient has resumed his *embonpoint* and healthy look, rides or walks without the least inconvenience; and it is with the greatest difficulty I can retain him at Berlin for the purpose of examining him a last time.

I consider it incumbent on me to give you these particulars as a feeble proof of my gratitude to you. Allow me to express my high regard, &c.

(Signed) GRAEFE.

LONDON:
SCHULZE AND CO., 13, POLAND-STREET.

LITHOTRIPTIC INSTITUTION.

PATRON.

HIS ROYAL HIGHNESS THE DUKE OF SUSSEX.

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MICHAEL SHEPLEY, ESQ.

This Institution is established to form a school where Lithotripsy may be learnt and perfected, at the same time as the inexpressible relief is extended to the poor suffering from the dreadful disease of the stone; no circumstance being more to be lamented—none calculated to make the indigent feel in a more agonizing degree the inequality betwixt their lot and that of the privileged opulent classes, than the necessity of submitting, for want of pecuniary means, to the infliction of the knife, where the case does not require it.

If the confidence of the Committee, in the resources of the Art of Lithotripsy, gave them the best hopes at the first onset, how much greater is their feeling of triumphant congratulation now; the medical officer of their Institution having demonstrated in an irrefragable manner the success of the operation of Lithotripsy, in the presence of numerous eminent Surgeons at the Royal Hospitals of Greenwich, Chelsea, Chelsea Military Asylum, St. Bartholomew, London, Westminster, Nottingham, Derby, Colchester, and also at the London University. This public testimony is corroborated by the evidence of extensive practice, which has signally proved the inestimable benefits of the Lithotriptic operation and justifies its classification among the greatest blessings which professional science has conferred upon mankind.

The following Donations and Subscriptions in support of the proposed Institution, have been notified to the Provisional Committee:

	Donations.			Ann. Sub.		
	£.	*s.*	*d.*	£.	*s.*	*d.*
Amherst, Lord	20	0	0	2	2	0
Ashburton, Lord	10	0	0			
A. B.	2	0	0			
Ainslie, Dr. Whitlaw, M.D.	1	1	0			
Albion and Star Evening Paper	2	2	0			
Alexander, James, Esq	5	0	0			
Ames, James, Esq.	21	0	0			
"An Angler"	10	10	0	5	0	0
Anguish, Rev. G.	1	1	0			
Anonymous	5	0	0			
———	1	0	0			
———	1	0	0			
Appleyard, Richard, Esq.				1	1	0
Arbuthnot, General				1	1	0
Baker, J. R. Esq.				1	1	0
Baldwin, C. Barry, Esq.	10	0	0			
Beaumont, R. H. Esq.	5	0	0			
Beaumont, Barber, Esq.	5	0	0			

	Donations.			Ann. Sub.		
	£.	s.	d.	£.	s.	d.
Birch, Mr. Alderman	5	0	0			
Blackall, Dr. M.D. (Exeter.)	2	0	0			
Blunt, Sir Charles, Bart. M.P.	50	0	0	5	0	0
Bosanquet, Rt. Hon. Mr. Justice	21	0	0			
Bowden, John Esq.	50	0	0	5	0	0
Bowden, John William, Esq.	5	0	0			
Bowles, H. C. Esq.	5	0	0			
Boycott, W. Esq.				1	1	0
Boyd, Walter, Esq.	10	0	0			
Boyd, Robert, Esq.	1	1	0			
Boxall, William, Esq.	10	0	0			
Bradshaw, Augustus Hill, Esq.	10	10	0			
Bramah, T. Esq.	10	0	0			
Branfill, Benjamin, Esq.	25	0	0	5	0	0
Briggs, G. Esq.	2	2	0			
Broadwood, George Esq.	100	0	0			
Brown, Thomas Pearse, Esq.	5	0	0	1	1	0
Bryan. J. V. Esq.	1	0	0			
Burrell, Sir Charles, Bart. M.P.	5	0	0			
Cleveland, the Duke of	10	0	0			
Clanwilliam, the Earl of	20	0	0			
Cannon, E B. Esq.	5	0	0			
Carttar, C. G. Esq.	1	1	0			
Chance H. Esq.				1	1	0
Cock, Simon, Esq				1	1	0
Clarke, John, C. Esq	1	1	0			
C. M. C. M. V.	5	5	0			
Combe, H. Esq	5	0	0			
Cottin, Benjamin, Esq.				1	0	0
Cottrell, James, Esq	1	0	0			
Courtney, Rev. John	10	0	0	1	1	0
Coventry, Thomas Esq	1	1	0			
Creed, Richard, Esq.				1	1	0
Crombie, Rev. Dr. L.L.D. F.R.S	5	0	0	2	2	0
Currie, Raikes, Esq.	5	5	0	1	1	0
Curteis, John Esq	10	10	0			
Curtis, J. Esq	5	5	0			
Davenport, Rev. Walter, (Bromley)	5	0	0			
Davis, Gideon, Esq.	5	0	0			
Dawes, Rev. Mr.	2	0	0	1	0	0
Dobree, B. Esq				1	1	0
Dobson, Sir Richard, M.D. (Greenwich)	5	0	0			

	Donations.			Ann. Sub.		
	£.	s.	d.	£.	s.	d.
Donnelly, Admiral	5	0	0			
Dunlop, James, Esq.	5	0	0			
Egremont, the Earl of	50	0	0			
Egerton, Lord Francis	20	0	0			
Eliot, Captain, R.N.	1	1	0			
Evelyn, Lynden, Esq.				1	1	0
Fitzwilliam, Earl	20	0	0			
Farrer, Oliver, Esq.	5	0	0			
Forbes, J. H. Esq	1	1	0			
Friend a, (per B. Branfill, Esq.)	1	1	0			
Garvagh, Lord	1	1	0			
Garrard, Sebastian, Esq.				1	1	0
Glossop, Rev. Henry				2	2	0
Goldsmid, Isaac Lyon, Esq.	10	0	0			
Goldsmid, A. A. Esq.	5	0	0			
Goodwin, George, Esq	50	0	0	5	0	0
Gosling, Francis, Esq.	10	0	0			
Gowan, George, Esq	2	2	0			
Grant, William, Esq.	5	0	0			
Greene, John Hooke, Esq. (Bath.)				1	1	0
Grey, Thomas, Esq.	5	0	0			
Gribble, John B. Esq.				1	1	0
Gutteridge, Joseph, Esq.	25	0	0	2	0	0
Howe, Earl				3	3	0
Hertford, the Marquis of	100	0	0			
Hardy, John, Esq. M.P.	5	0	0			
Hartopp, E. B. Esq.	10	10	0			
Hawes, Benjamin, Esq.	5	5	0			
Heneage, George F. Esq	20	0	0			
Hewson, Rev. F. (Liverpool)	5	0	0			
Hoare, Henry H. Esq.	20	0	0			
Hoare, H. Merrick, Esq.	10	10	0			
Holford, James, Esq.	21	0	0			
Holford, John, J. Esq.	5	0	0			
Holford, C. Esq.				1	1	0
Holland, W. Esq.	1	0	0			
Holland, Thomas L. Esq				1	1	0
Horsman, P. Esq.				1	0	0
Hughes, Henry, Esq.	5	0	0			
Jesson, Henry, Esq.	2	0	0			
Jones, William C. Esq.	5	0	0	2	0	0

	Donations.			Ann. Sub.		
	£.	s.	d.	£.	s.	d.
Judd, William, Esq.	1	0	0			
Knight of Kerry, the	1	1	0			
Knowles, James, Esq.				1	1	0
Labouchère, John, Esq	10	0	0			
Ladies, two per Rev. Dr. Crombie)	2	2	0			
Ladies, two	1	1	0			
Lady, a, (per Michael Shepley, Esq.)				2	0	0
————(per idem)				2	0	0
Lake, J. Esq.	10	0	0	5	0	0
Lanyon, J. Esq.				1	1	0
Law, George, Esq.	1	1	0			
Leslie, Dr.				1	1	0
L. M.	5	0	0			
Lloyd, Samuel Jones, Esq.	21	0	0			
Lloyd, Lewis, Esq.	21	0	0			
Lyde, William Esq.	21	0	0			
Mackenzie, H. Esq.	1	1	0			
Maconochie, R. Esq.				1	1	0
Manbers, J. F. Esq.	5	0	0			
Marsden, Robert, Esq.	1	0	0			
Mash, T. B. Esq.	5	0	0			
Matthie, John Esq.	10	0	0			
Meheux, John, Esq.	10	0	0	2	0	0
Mills, Charles, Esq.	5	0	0			
Moore, J. Sen. Esq. (Tunbridge Wells).	5	0	0			
Mc. Guffie, Esq				1	1	0
Morris, General	10	0	0	5	0	0
Morris, Charles, Jun. Esq.	50	0	0	5	0	0
Morris, Charles, Esq.	5	0	0			
Northumberland, the Duke of	50	0	0			
Newark, Lord	2	2	0			
Neeld, Joseph Esq. M.P.	20	0	0			
Nesbitt, Cosby, Esq.	50	0	0	5	0	0
Newnham, Thomas, Esq.	1	1	0			
Norman, Henry, Esq.	2	0	0			
Oddie, Henry H. Esq	10	0	0			
Oldknow, H. Esq. (Nottingham)	10	0	0			
Olive, Jeremiah, Esq.	50	0	0			
Oliverson, R. Esq.				1	0	0
Parkins, Edward, Esq.				1	1	0
Parnther, M. S. Esq.	5	0	0			

	Donations			Ann. Sub.		
	£.	s.	d.	£.	s.	d.
Paynter, F. Esq	10	0	0			
Pearse, J. Esq.	5	0	0			
Pearse, William, Esq	1	1	0			
Pearse, Robert, Esq.	2	0	0			
Pennant, G. H. Dawkins, Esq.	100	0	0			
Petit, Louis Hayes, Esq	10	10	0			
Phillips, Sir G. Bart	10	0	0			
Phillips, J. H. Esq.	5	0	0			
Phillips, John Burton, Esq.	5	0	0			
Pierrepoint, Right Hon. H.M.	5	0	0			
Pike, John, Esq				1	1	0
Prater, Charles, Esq	5	0	0			
Prickett, Robert, Esq.	21	0	0			
Rainsford, ——— Esq	5	0	0			
Reid, Sir J. Rae Bart. M.P.	5	0	0			
Reid, George, Esq	5	0	0			
Richardson, Mr. Justice				1	1	0
Richardson, Edward Esq	5	0	0			
Richardson, Charles, Esq				2	2	0
Rothschild, N. M. Esq	21	0	0			
Rutley, J. T. Esq				1	1	0
Rutley, J. R, Esq				1	1	0
Somerset, the Duke of	50	0	0			
St. Aubyn, Sir John Bart. F.R.S				2	2	0
Savory, J. C. Esq	1	1	0			
Seaman, Samuel, Esq.	50	0	0			
Seton, James, Esq	5	0	0			
Shedden, Robert, Esq.	5	0	0	1	0	0
Shepley, Michael, Esq.	50	0	0			
Skinner, Samuel, Esq.	2	2	0			
Smith, Charles Esq. (Liverpool).	13	0	0			
Smith, J. G. Esq	10	0	0			
Smith, Peter, Esq	5	0	0			
Soames, J. Esq,	1	1	0			
Spencer, William, Esq.	3	0	0			
St. Paul, Sir Horace, Bart				1	1	0
Sutton, John, Esq	1	1	0			
The Master, Wardens, and Court of Assistants of the Worshipful Company of Tallow-Chandlers	21	0	0			
Thomas, Inigo, Esq.	5	0	0	1	0	0
Thornicroft, Rev. J.	5	0	0			

	Donations.			Ann. Sub.		
	£.	s.	d.	£.	s.	d.
Thornton, William, Lieut. Gen........	10	10	0			
Trotter, Sir Coutts Bart..............	10	0	0			
Westminster, the very Rev. the Dean of,	50	0	0	5	0	0
White, Rear Admiral................	2	2	0			
Walker James, Esq.	1	1	0			
Ward, William, Esq.................	5	0	0			
Watran, Thomas S. Esq.	1	1	0			
W. H	5	0	0			
Wiggin, Benjamin, Esq..............	10	0	0			
Wilson, Lestocq, Esq................				2	2	0
Wilson, John, Esq..................				1	0	0
Wilson, Thomas, Esq.	5	0	0			
Wood, Colonel, M.P.................				5	0	0
Wright, John Smith, Esq	21	0	0			
Wright, John Esq..................	5	0	0			

The Committee subjoin the following testimony contained in a Letter from His Royal Highness the Duke of Sussex :

" The great importance of the object you have in view has induced me, as a duty I owe to the public, to institute very minute inquiries into the real merit and utility of the invention of Lithotripsy before I could consent to your request that my name may be inserted as Patron of the Lithotriptic Hospital. I am much gratified in stating that the result of these investigations is highly satisfactory. I have received the public testimony of some of the most eminent surgeons of this metropolis as to their opinion of the value of the new method of alleviating one of the most dreadful afflictions to which humanity is liable, both as regards the disorder itself, and the painful and hazardous operation which alone has hitherto afforded any rational hope of perfect and permanent cure. This opinion is, I am happy to say, amply confirmed by the certificates which you have shewn me, from several of the most distinguished surgeons in London, as well as by the testimonials which the professional gentlemen of the hospitals of Greenwich and Chelsea have given, and likewise by the approbation communicated from the medical officers of the public establishments of Nottingham and Derby, to which latter I have paid particular attention, on account of the prevalence of that unfortunate complaint in those counties.

" Thus armed, I feel myself justified, and have great pleasure in becoming patron of the Lithotriptic Hospital; and with my warmest wishes for its prosperity, and that you may live to see it become the basis of a new and important school.

The Provisional Committee feel greatly indebted to his Royal Highness for his kind condescension, and ready acquiescence in their wishes, by permitting the publication of the above letter; and they look forward with a confident hope that it will induce a benevolent public to contribute liberally towards the support of this highly estimable institution.

Subscriptions received for the hospital by Messrs. Coutts and Co. Strand; Messrs. Jones, Lloyd, and Co. Lothbury; Messrs. Robarts, Curtis, and Co. 15, Lombard Street; Sir Samuel Scott, Bart. and Co. 1, Cavendish Square; and Messrs. Wright and Co. Henrietta Street, Covent Garden.

All Communications to be addressed (Post Paid) to Mr. T. Biggs, Honorary Secretary, 4, Queen Ann Street, Cavendish Square.

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